

**ENCLOSURE 2**

**OYSTER CREEK**

**Calculation No. PSAT 05201H.08, Revision 3, "Dose Assessment for Oyster Creek  
Control Room Habitability"**

**NON-PROPRIETARY VERSION**



**ATTACHMENT 2**  
**Owners Acceptance Review Checklist for External Design Analysis**  
**Page 1 of 1**

**DESIGN ANALYSIS NO. PSAT 05201H.08 REV: 3**

		Yes	No	N/A
1.	Do assumptions have sufficient rationale?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Are assumptions compatible with the way the plant is operated and with the licensing basis? (For AST per the NRC Submittal)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Do the design inputs have sufficient rationale?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Are design inputs correct and reasonable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Are design inputs compatible with the way the plant is operated and with the licensing basis? (For AST per the NRC Submittal)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Are Engineering Judgments clearly documented and justified?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Are Engineering Judgments compatible with the way the plant is operated and with the licensing basis? (For AST per the NRC Submittal)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Do the results and conclusions satisfy the purpose and objective of the Design Analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Are the results and conclusions compatible with the way the plant is operated and with the licensing basis? (For AST per the NRC Submittal)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Does the Design Analysis include the applicable design basis documentation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Have any limitations on the use of the results been identified and transmitted to the appropriate organizations? (NRC Approval required to implement)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
12.	Are there any unverified assumptions?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13.	Do all unverified assumptions have a tracking and closure mechanism in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14.	Have all affected design analyses been documented on the Affected Documents List (ADL) for the associated Configuration Change?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	Do the sources of inputs <b>and</b> analysis methodology used meet current technical requirements and regulatory commitments? (If the input sources <b>or</b> analysis methodology are based on an out-of-date methodology or code, additional reconciliation may be required if the site has since committed to a more recent code)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	Have vendor supporting technical documents and references (including GE DRFs) been reviewed when necessary?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

EXELON REVIEWER: T.J. Mscisz

  
Print / Sign

DATE: 03/23/2007

CALCULATION TITLE PAGE

CALCULATION NUMBER: PSAT 05201H.08

CALCULATION TITLE: "Dose Assessment for Oyster Creek Control Room Habitability"

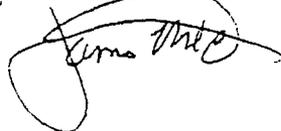
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REVISION: 0

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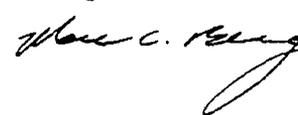
3 J. Metcalf 3/22/07



H. Pustulka 3/23/07  
(Main Body)



M. Berg 3/23/07



R. Sher 3/23/07  
(Preparer of Check Appendix C)



REASON FOR REVISION:

Nonconformance Rpt

Revision 0:

1. Initial Issue

N/A

Revision 1:

1. Update revision number for Reference 3 due to corrected Control Room X/Qs. (Yard and Turbine Building), corrected Control Room Occupancy Factors based on SRP values, and use of 1.0 psig drywell spray cutoff pressure instead of 0 psig.
2. Correct STARDOSE "Input.dat" file according to the revised Reference 3.

Revision 2:

1. p.3 Suppression pool scrubbing credit deleted.  
p.5 Statement added referring to Appendix A for the calculation of torus spray removal and for re-evolution of radioiodine; statement added referring to Appendix B for recalculation of Sr DCFs; statement added referring to Appendix C for RADTRAD check calculation.

p.6 Statement added that DCFs for Sr isotopes are those applicable to SrO; References 10, 11, and 12 added; reference to manual annotation of Attachment 2 deleted (since RADTRAD files are now provided); discussion of 5 rem TEDE limit expanded to refer to Reference 11.

pp.7&8 Finite CR volume correction now refers to Reference 11; "Results" section updated to reflect revised Attachment 3; reference provided for "other external sources"; EAB and LPZ doses added; updated "Conclusions" section.

2. Appendices A, B, C, C1-C6 added; Attachments 1, 2, and 3 updated to use RADTRAD-based DCFs and to remove pool scrubbing credit.

Revision 3:

1. Reference 3 was revised to update the revision level.
2. Reference 2 was revised to update the revision level.
3. Revision to Reference 3 included a change in offsite X/Qs and Occupancy Factor to the control room. These changes were integrated into this calculation
4. Analysis was recalculated to remove the credit for Reactor Building Mixing.
5. Credit was taken for the MSIV leakage delay.
6. The Occupancy Factor used in the control room was changed to 0.25 after 24 hours.
7. The Calculation section was extensively revised to fully explain the above revisions.
8. Attachments 1, 2 and 3 as well as Appendix C were modified to reflect the above revisions.

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### **Purpose**

The purpose of this calculation is to apply the revised DBA source term of Reference 1 and the STARDOSE Computer Code [Ref 2] to the calculation of Control Room (CR) and offsite Total Effective Dose Equivalents (TEDEs) for the Oyster Creek Generating Station.

### **Methodology**

The overall dose calculation model consists of seven control volumes to represent the damaged core and RCS (CORE), the drywell portion of the primary containment (DW), the torus airspace or wetwell portion of the primary containment (WW), the suppression pool (SP), the reactor building or secondary containment (RB), the space between the two MSIVs in the one steam line wherein both MSIVs are assumed to successfully close (SL), and the control room itself (CR). These control volumes are arranged as shown on Figure 1 with the various junctions that connect them. These junctions are associated with volumetric flows which determine the rate at which radioactivity is exchanged between the control volumes. In addition removal processes such as spray impaction, sedimentation, adsorption, filtration and others are modeled within and between control volumes, as appropriate.

The junctions related to containment transport and environmental releases include:

- Drywell-to-wetwell flow,
- Wetwell-to-drywell vacuum breaker flow,
- SGTS exhaust flow (via plant stack),
- Leakage flow to the reactor building from the drywell, the wetwell, and the suppression pool, and
- Bypass pathways (MSIV leakage, isolation condenser vent valve leakage, service air leakage, and containment spray test line leakage to the turbine building, and gaseous nitrogen leakage to the yard).

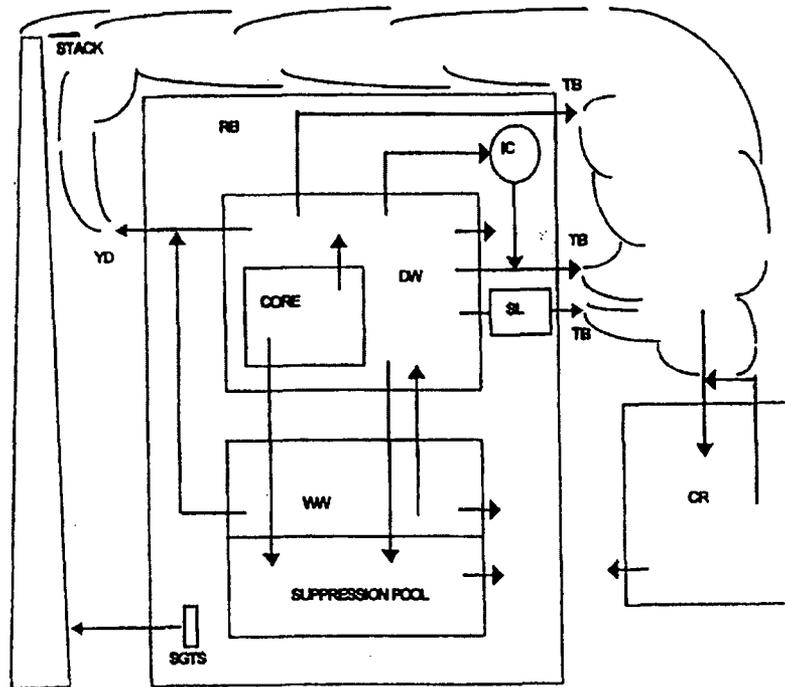


Figure 1

The core junctions effect the release of radioactivity to both the drywell and the suppression pool in parallel. The drywell and suppression pool releases are an example of conservative "double-counting" in that the same amount of activity is assumed to be in both places at the same time. In fact, the release of radioactivity to the suppression pool is assumed in the analysis to be complete within the first two hours of the accident, even though it actually takes many hours for the sprays and other mechanisms to remove the radioactivity from the containment atmosphere and get it into the water of the suppression pool.

Control room junctions exist in the model to take activity out of the environment (after it has been diluted by the appropriate  $X/Q$ ) and bring it into the control room. For Oyster Creek there are no credited filters in the control room ventilation; there are only redundant intakes and air-handling units and provision for re-circulating the air so that intake can be minimized under accident conditions. As a practical matter, the concentration of radioactivity within the control room tracks very closely the concentration at the air intake, even on maximum recirculation flow (see Assumption 1).

The STARDOSE Computer Code [Ref 2] is used for the dose calculation. All input to this model except for radionuclide data are documented in Reference 3. For plume shine a factor is applied to the WB dose internal to the CR to account for this external contribution. The factor is calculated in the Calculation section. With one foot of concrete shielding assumed, this factor is small.

Spray removal rates in the torus are calculated in Appendix A. Appendix A also provides the calculation of a factor that is used to account for re-evolved radioiodine from the suppression pool. This factor is applied to the organic radioiodine dose contribution over a specified time interval defined below. Because the suppression pool pH is maintained well above 7.0 for at least 30 days post-accident, this factor is negligibly small.

For the Sr isotopes, DCFs based on the oxide form (SrO) rather than the titanate (SrTiO<sub>3</sub>) are used. The justification for this is given in Appendix B.

A check calculation using the RADTRAD version 3.03 computer code [Ref. 10] is described in Appendix C.

The STARDOSE [Ref 2] library files, inputs and results can be found in Attachments 1, 2 and 3 respectively. To model the release delay in the steam lines it was necessary to create additional library files, and make use of several input cases when carrying out the dose analysis. The details of this process are presented seen in the Calculation section.

### Assumptions

Assumption 1: The radionuclide concentration inside the CR is the same as that of the plume at the air intake.

Justification: The CR volume from Reference 3, Item 3.5 is 27500ft<sup>3</sup>. The volumetric exchange rate (with the environment) is assumed to be 14000 cfm (Item 3.13). Even on maximum recirculation flow, the volumetric flow is greater than 1/10 of the assumed 14000 cfm; and therefore, the exchange rate will always be greater than 0.05 per minute or 3 per hour. Since the time to come to equilibrium is about three inverse exchanges, it requires only one hour for the CR to equilibrate with the environment. The total duration of the dose calculation is 720 hours with concentration changing slowly with time. Therefore, equilibrium can be assumed.

### References

1. NUREG-1465, "Accident Source Terms for Light-Water Nuclear Power Plants", February, 1995
2. PSAT CI09.03, Rev.1, "STARDOSE Model Report", March 12, 2002
3. PSAT 05201U.03, "Dose Calculation Data Base for Application of the Revised DBA Source Term to the Oyster Creek Nuclear Power Plant", Revision 6
4. Federal Guide 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion", 1988

5. NUREG/CR-5106 (Manual for TACT5 – Version SAIC 9/23/87)
6. NUREG/CR-4691, “MELCOR Accident Consequence Code System (MACCS)”, February 1990
7. TID-14844, “Calculation of Distance Factors for Power and Test Reactor Sites”, March 1962
8. Price, W.J., Nuclear Radiation Detection, McGraw-Hill, New York, 1958
9. NUREG-0737, “Clarification of TMI Action Plan Requirements”, November 1980
10. RADTRAD version 3.03, USNRC, October 2002
11. “Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors”, Regulatory Guide 1.183, July 2000
12. United Engineers & Constructors, Inc., “Analyses in Support of GPUN Responses to NRC RAIs Concerning Compliance with NUREG-0737, Item II.B.2”, June 1985

### **Calculation**

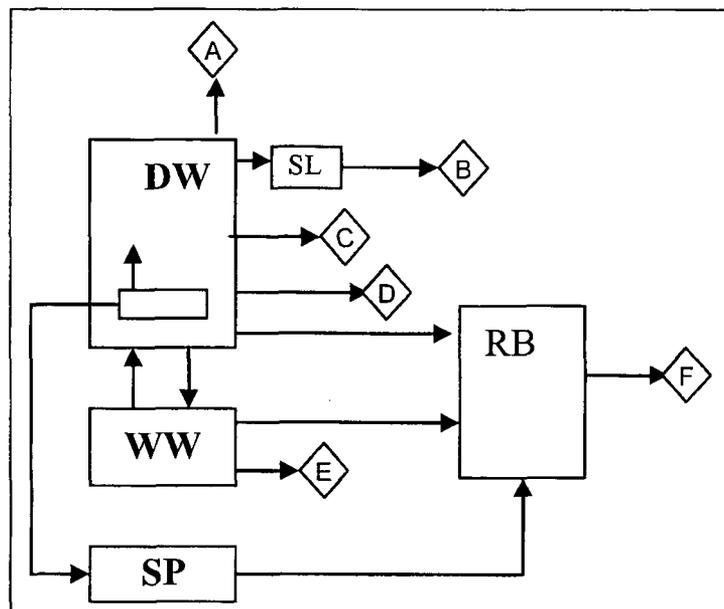
#### STARDOSE Computer Code

To perform offsite dose calculations and operator dose calculations for radioactivity having entered the CR, the STARDOSE computer code is used [Ref 2]. Dose conversion factors are based on the FGR11&12 default file from Reference 10 (based, in turn, on Reference 4 for inhalation doses). Radioactive decay rates are taken from Reference 5. All radionuclide input data (including core inventory per MW from Reference 3) are presented in the LIBFILE1.TXT files located in Attachment 1. The radionuclides considered are those from References 6 and 10 (except the cobalt isotopes which are not significant) plus additional Kr and Xe isotopes, in particular those included in Reference 7. As mentioned previously, DCFs for the SR isotopes are those applicable to SrO, as explained in Appendix B and as used in Reference 6.

#### Dose Contributions

To accommodate the MSIV delays (8.7 hours for the steam line with one MSIV failed open and 13 hours for the steam line with both MSIVs closed per Item 8.4 of Reference 3) in this calculation, dose contribution pathways were executed on a time-dependent basis. To do this, three cases were run on separate timelines. The following pathway configuration for each case can be seen in Figure 2. The six dose contribution pathways were grouped by their associated time of release. Case 1 encompasses all bypass pathways EXCEPT the MSIVs, including: the isolation condenser vent valve leakage, service air leakage, and containment spray test line leakage to the turbine building, and gaseous nitrogen leakage to the yard. Case 2 includes the leakage of the steam line with one MSIV stuck open (MSIV1) which is on a 8.7 hr delay. Case 3 includes the steam line with two MSIVs closed (MSIV2) and is on a 13 hr delay. The activity from pathways that are not being evaluated in a particular case were directed as necessary to a dummy volume. In this way, the pertinent

activity concentrations in the source control volumes (i.e., the DW and the WW) remained unaffected by the delays. The dose contribution from each case can be summed, (recognizing the time delay for Cases 2 and 3), and the total dose can then be calculated.



Six pathways (A-F) contributions to offsite dose

◇	Pathway	Case 1	Case 2	Case 3
A	DW → environment- [TB]: environment (2)*	X		
B	SL →environment- [MSIV2]			X
C	DW →environment- [MSIV1]: environment (1)*		X	
D	DW → environment- [RB]: environment (3)*	X		
E	WW →environment	X		
F	RB →environment	X		

\*Stardose pathway , [Ref 3, item 3.14 column heading]

Figure 2

The delays, themselves, were handled by decaying the inventories by the delay time. Each of the three STARDOSE cases was executed with their own corresponding LIBFILE1.txt and relative start time. For example, Case 2 (the dose contribution from only the steam line with one MSIV stuck open was run using an inventory that had been decayed 8.7 hours and the dose contribution calculated for Case 2 at one hour should be added to Case 1 results at 9.7 hours to determine a total dose for that time period. In other words, for a case that involves a delayed release (i.e., Case 2 or Case 3), activity removal in the containment is done in real time using a core inventory that is pre-decayed, and the portion of the model that deals with the dose calculation (beyond the release point) is set forward in time by an amount equal to the time delay. Once again, using Case 2 as the example, a X/Q or

occupancy factor change that occurs at 24 hours in real time would occur 8.7 hours sooner (at 15.3 hours) for the Case 2 with the release delayed 8.7 hours.

#### LIBFILE1.TXT Creation

To accommodate delay of the steam line releases, the inventories were decayed by the associated delay time. In this way, activity releases accounted for their subsequent decay and remained time-dependent. Three separate library files were used in this analysis, (0 decay, 8.7 hours decay and 13 hours decay, where the 0 hr decay values correspond to the core inventory values found in Reference 3). The decayed library files were created using the STARDOSE computer code [Ref 2]. The simple execution was done by transferring all of the core activity to a single control volume (CORE'), and reporting the subsequent values at edit times of 8.7 and 13 hours. The LIBFILE1.TXT for this case can be seen in Attachment 1.1, and the input to create the additional library files found as Attachments 1.2 and 1.3 can be seen in Attachment 2.1. It is important to note that this methodology introduces some conservatism in that important decay daughters of iodine (e.g., Xe133 and Xe135) and of tellurium (e.g., I131 and I132) experience release fractions much greater than the release fractions of their parent, whereas it is the release fraction of their parent that would actually determine their appearance later in time.

#### Corresponding X/Q Periods

To determine of the most limiting 2 hour period, all three cases were run holding all X/Q's constant to determine the 2 hours with the greatest rate of dose increase. Doing so showed the worst offsite X/Q to be within the first several hours following the accident, despite the delay in the steam lines. Refining this analysis, using the input file found in Attachment 2.2, the worst 2 hours was found to be between 1.5 and 3.5 hours. However, the highest rate of dose accumulation for the CR was found to be at the time of the delayed MSIV releases (beginning at approximately 8.7 and extending through 8 hours to approximately 16.7 hours, 3.7 hours beyond the start of release for the steam line with both MSIVs closed). This phenomenon of the later peak in CR dose accumulation is because of the decreased effect that the early whole body dose contribution has on the CR dose. Whole body dose peaks early on and then decreases, whereas the CEDE dose rate remains relatively stable up to 8.7 hours. However, because of the finite-volume whole body dose correction applied to the CR, the high initial whole body dose has relatively little effect on the CR TEDE compared to the EAB TEDE. With the effective start of the MSIV leakage at 8.7 hours, the CEDE dose rate is greatly increased. For this reason, the offsite dose rate peaks early, while the CR peaks after the start of the first MSIV release.

#### Timing

The STARDOSE run for each case runs on a unique timeline. After the runs have been executed they are lined up for summation. Figure 3 provides a timeline for this analysis.

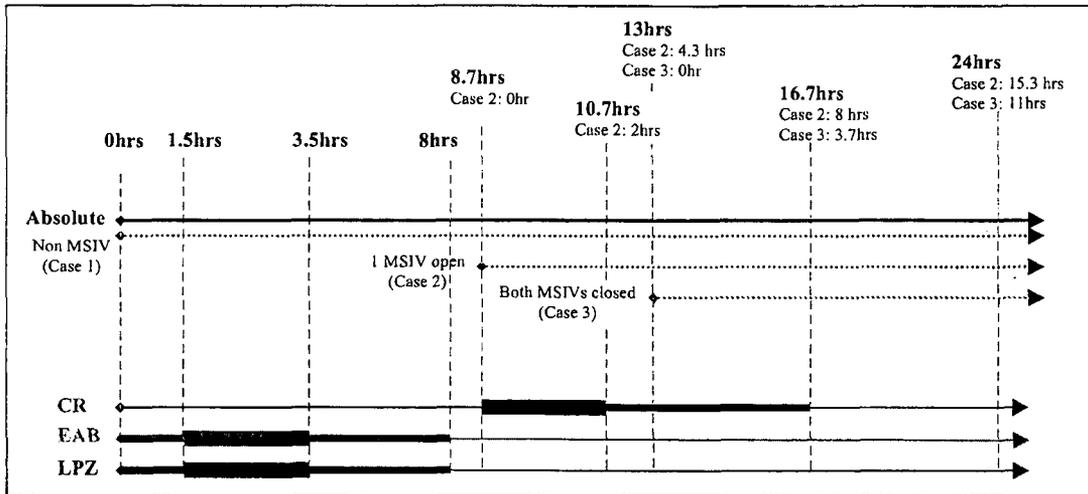


Figure 3

In the above figure, the broad portion of the time line for each receptor shows the period when the limiting X/Qs are applied.

It is important to keep in mind that the X/Q time periods are a function of absolute time, not relative case time. For example, the maximum CR X/Q is applied beginning when the delayed MSIV release begins (the worst 8 hours for does accumulation in the CR). The STARDOSE input for this event is entered as follows:

<u>Case</u>	<u>Time Duration (hrs)</u>
1	8.7 to 16.7
2	0 to 8
3	0 to 3.7

These values all correspond to the same absolute system time, but the times have been offset for individual case execution to accommodate the delay times of the steam lines.

Case Inputs

The STARDOSE input files (INPUT.DAT) for Cases 1 through 3 are included as Attachments 2.3 through 2.5 respectively. Note that the release rate of iodine to the suppression pool is twice that to the drywell atmosphere. By increasing the rate in this way and providing 100% filtration of the particulate in the pathway from the suppression pool to the RB, the gaseous iodine (elemental plus organic) corresponds to what 10% of the iodine in the stream would be if the two release rates were the same. Of the 10% ESF leakage iodine released to the RB via this pathway, 97% is elemental and 3% is organic as required by Reference 11.

Following current NRC and international practice regarding radiation protection (e.g., revisions to 10CFR Part 20 and Part 100), Total Effective Dose Equivalent (TEDE) doses

are being reported in lieu of separate WB, skin, and thyroid doses. This is fully consistent with 10CFR Part 50, Appendix A, GDC-19 which establishes an operator dose limit of 5 rem WB or the equivalent to any other part of the body. The TEDE concept is based on equivalent doses to all important organs and parts of the body; and since by definition TEDE include the WB contribution, it is quite conservative to establish a 5 rem TEDE limit as that which corresponds to the 5 rem WB equivalency of GDC-19. The use of TEDE as the dose measure and the concept of a 5 rem TEDE corresponding to the 5 rem WB equivalency of GDC-19 is consistent with Reference 11.

### Plume Calculation

To calculate the external plume contribution to the inside dose, the assumption of equal activity concentrations inside and outside the CR is used (Assumption 1). The STARDOSE code makes use of the following correction to the whole body dose inside the CR to account for the finite volume (also consistent with Reference 11):

$$\text{Correction Factor} = (\text{VCR})^{0.338}/1173 - (27500)^{0.338}/1173 = 0.027$$

Considering one foot of concrete shielding and an “average” gamma energy of 0.7 MeV (e.g., from Reference 7), the shielding effectiveness can be approximated as:

$$\text{Eff} = e^{-\mu d}$$

where the  $\mu$  is the mass absorption coefficient and  $d$  is the thickness of the shield. From Figure 1-12 of Reference 8, the mass absorption coefficient for a 0.7 MeV gamma (normalized by density) is about  $0.08 \text{ cm}^2/\text{g}$ . Assuming a concrete density of  $2.5 \text{ g/cc}$  (2.5 that of water) and a  $d$  of 30 cm (one foot) thickness, the coefficient becomes 0.2 and the overall expression becomes  $2.5\text{E-}3$ . Therefore, the one foot concrete thickness is about ten times more effective in reducing gamma dose to the operator than the finite volume of the CR. To account for the external plume contribution to the operator dose, the whole body dose calculated by STARDOSE for sources inside the CR will be multiplied by a factor of 0.1.

## **Results**

The results for the STARDOSE edits at 21 days and at 30 days are presented for Cases 1, 2 and 3 as Attachments 3.3 through 3.5 respectively (excerpted from RESULTS.OUT). From the 21-day edit and the 30-day edit, one can see that the organic iodine dose contribution to the CR dose is 0.045 rem TEDE over that period of time. Multiplying this organic iodine dose contribution by the factor of 0.068 (the factor from Appendix A that reflects the ratio of elemental iodine to organic iodine airborne beyond 21 days when the pH reaches its minimum value), the result is  $0.045 \text{ rem} \times 0.068 = 3.1\text{E-}3 \text{ rem TEDE}$ . This contribution is negligible. The overall CR TEDE results are as follows:

<i>Contributor</i>	<u>doses in rem TEDE</u>			
	<i>Case 1</i>	<i>Case 2</i>	<i>Case 3</i>	<i>Total</i>
CEDE due to inhalation of organic iodine -	0.73	0.33	0.16	1.22
CEDE due to inhalation of elemental iodine -	0.68	0.05	0.02	0.75
CEDE due to inhalation of particulate iodine -	0.09	0.80	0.14	1.04
CEDE due to inhalation of cesium/rubidium -	0.03	0.26	0.05	0.33
CEDE due to inhalation of tellurium/antimony -	0.01	0.05	0.01	0.06
CEDE due to inhalation of barium -	0.00	0.01	0.00	0.01
CEDE due to inhalation of noble metals -	0.00	0.05	0.01	0.06
CEDE due to inhalation of lanthanum group -	0.00	0.03	0.01	0.04
CEDE due to inhalation of cerium group -	0.01	0.10	0.02	0.13
CEDE due to inhalation of strontium -	0.01	0.05	0.01	0.06
Whole body due to plume inside CR -	0.23	0.05	0.01	0.29
Whole body due to plume outside CR* -	0.02	0.01	0.00	0.03
Whole body due to other external sources** -	0.60	0.60	0.60	0.60
<b>TEDE</b>	<b>2.41</b>	<b>2.38</b>	<b>1.04</b>	<b>4.63</b>

\*10% of whole body dose due to plume inside the CR

\*\*From Reference 12

Exclusion Area Boundary (EAB) and Low Population Zone (LPZ) doses are also available from the STARDOSE analyses presented in Attachment 3. These are as follows:

		<u>doses in rem TEDE</u>			
		<i>Case 1</i>	<i>Case 2</i>	<i>Case 3</i>	<i>Total</i>
EAB TEDE (1.5 hours to 3.5 hours)-	WB	1.71	Because of the delay there is no release during this period.		1.71
	CEDE	0.20			0.20
	<b>Total</b>	<b>1.91</b>			<b>1.91</b>
LPZ TEDE (0 to 30 days)-	WB	0.44	0.05	0.02	0.51
	CEDE	0.06	0.02	0.01	0.08
	<b>Total</b>	<b>0.50</b>	<b>0.06</b>	<b>0.03</b>	<b>0.59</b>

The worst two-hour EAB dose period is found by applying the EAB X/Q of 1.41E-3 sec/m<sup>3</sup> [Ref 3, Item 5.4] over all time periods. Finding the largest two hour rate accumulation gives the following:

EAB TEDE (1.5 hour to 3.5 hours) -

1.91 rem TEDE

### Conclusions

The CR dose analysis contained in this report demonstrates that the Oyster Creek plant meets the radiological requirements of 10CFR Part 50, Appendix A, GDC-19 with respect to limiting the dose to the most exposed CR operator. Under the conditions imposed by the DBA event for CR habitability, the most exposed operator would not be subjected to radiation exposure resulting in doses in excess of 5 rem whole body or its equivalent to any part of the body for the duration of the accident (i.e., 5 rem TEDE as established by Reference 11). By demonstrating compliance with GDC-19, NUREG-0737 [Ref 9], Item III.D.3.4, is also satisfied.

The EAB and LPZ doses are observed to be a very small fraction of the 25 rem TEDE limit established by Reference 11.

The STARDOSE results are confirmed by the RADTRAD results from Appendix C which are: EAB TEDE (1.5 to 3.5 hours) = 2.083 rem, LPZ TEDE (0 to 30 days) = 0.63 rem, and CR TEDE = 4.84 rem (which includes the 0.6 rem external exposure not calculated by RADTRAD). These doses agree well with the STARDOSE results listed above.

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## Appendix C. RADTRAD Analysis to Check STARDOSE

### Purpose and Approach:

The purpose of this appendix is to show the results of an alternative calculation using RADTRAD version 3.03 (ref. [C.1]) to check the main calculation.

### RADTRAD Analysis Calculation

In order to maintain consistency with the STARDOSE calculations it was necessary to modify the RADTRAD default input files for the iodine inventory and dose conversion factors.

One reason for these modifications is that the STARDOSE library file (libfile1.txt) uses (effective) DCFs for the strontium isotopes (Sr-89, Sr-90, Sr-91, and Sr-92) that apply to the oxide SrO form, as discussed in Appendix B. The default RADTRAD file (Fgr11&12.inp) uses DCFs applicable to SrTiO<sub>3</sub>. To maintain dose equivalence it is necessary to change the Sr isotopes inventories in libfile1.txt by the ratio of the DCFs in order to construct the RADTRAD inventory file. The following table shows these changes.

Isotope	STARDOSE inventory, Ci	STARDOSE DCF, rem/Ci (SrO)	RADTRAD DCF, rem/Ci <sup>a</sup> (SrTiO <sub>3</sub> )	RADTRAD inventory, Ci
Sr-89	2.54E+04	6.512E+03	4.144E+04	3.99E+03
Sr-90	3.33E+03	2.3939E05	1.299E+06	6.12E+02
Sr-91	3.15E+04	9.324E+02	1.682E+03	1.75E+04
Sr-92	3.35E+04	6.29E+02	8.066E+02	2.61E+04

<sup>a</sup> DCF's in RADTRAD file are in Sv/Bq. DCF in rem/Ci = DCF in Sv/Bq x 3.7E+12

The revised RADTRAD inventory file is denoted oc60.nif.

The steamline releases to the environment begin at 8.7 hours (steamline with one MSIV open) or at 13 hours (steamline with two MSIVs closed). For these runs separate libfiles were prepared for STARDOSE and corresponding inventory files denoted 8pt7oc60.nif and 153oc60.nif were constructed for RADTRAD. These take account of the decay of the original source inventories over the time periods (8.7 and 13 hours). A check on these inventories is shown in Appendix C6, which is a spreadsheet comparing the entries in files 8pt7oc60.nif and 153oc60.nif with source inventories at 8.7 and 13 hours generated in the Microshield version 7 code. The agreement is seen to be quite good.

An additional difference between the STARDOSE and RADTRAD inventory files is that the STARDOSE file (libfile1-0hrDK.txt) includes 76 nuclides while the RADTRAD .inp file (Fgr11&12.inp) includes 60 nuclides. The RADTRAD .nif file must also contain the same 60 nuclides. Six of the 16 nuclides in the STARDOSE libfile that are not in the RADTRAD file are Xe-131m, Am-241, Cm-242, Cm-244, Pu-240, and Pu-241. The remaining 10 arise from the

fact that the STARDOSE file has 3 separate entries for each of the iodine isotopes (organic, elemental, and particulate), while the RADTRAD file has only a single entry for each isotope.

### Multiple-Pathways-to-Environment Issue

Seven release pathways to the environment were identified, which are shown in Table C-2 below. Each release pathway to the environment was treated separately and control room and offsite doses were added up in the end. Note that for each of these single leakage pathway runs, the other releases were not removed, but diverted to a “dummy” volume instead of the environment, so that the remaining activity in each of the control volumes was correctly evaluated.

There is one set of X/Qs for each of these pathways, and in RADTRAD the control room X/Qs are linked to the control room volume, unlike STARDOSE, where they are linked to the release pathway. Pathways with the same X/Qs and the same filter efficiencies could be combined into a single run with summed flow rates, however, this was not done.

For each pathway, the RADTRAD time-flow rate pairs were the same as the STARDOSE ones, with the exception that STARDOSE lists the ending time of an interval while RADTRAD lists the beginning time.

### ESF Release

As explained in the main body of the calculation, ESF leakage is treated in STARDOSE by putting twice as much iodine activity (but iodine only) in the suppression pool as in the drywell, and filtering out all the particulate form so that the iodine release from the suppression pool into the reactor building includes only gaseous iodine (elemental and organic), and amounts to 10% of the initial iodine inventory.

Unfortunately, it is not possible to do this in RADTRAD. Indeed, the only way to model a release from the core into a control volume is to direct a fraction of an entire core inventory file to that specific volume. Moreover, the code accepts only one inventory file at a time. One option would have been to have doubled the initial core inventory and to have directed 50% of it to the drywell and 50% of it to the suppression pool. However, this option would have put noble gases in the suppression pool control volume in addition to the iodine and other particle isotopes. While the latter isotopes can be filtered out when modeling the leakage to the reactor building, noble gases cannot be removed. Therefore, this option was abandoned, as it would have tripled the noble gas inventory in the problem. (Note that some noble gases are actually produced, resulting from decay of iodine isotopes in the suppression pool, but there should not be any noble gases in the suppression pool at the outset.)

Consequently, a specific nuclide inventory file (named ocesf.nif) was prepared. It includes iodine isotopes (with inventory doubled to reach the 10% release level) and all other isotopes to respect the parent-daughter relationships of the original file (but with inventories set to zero). The esf RADTRAD run was then performed with this specific “ESF” inventory released to the suppression pool and leaking into the RB so as to take into account its impact on offsite and control room doses. As mentioned above, in the leak path from the suppression pool to the RB, the filter efficiencies for elemental and organic iodine were zero and particulate iodine was totally filtered out.

#### Flow rates and X/Qs

Timing, flow rates and X/Qs corresponded to those in the main STARDOSE calculation. Flow rates from the drywell, wetwell, and steamline were set at their initial value at  $t = 0$ , and reduced by a factor of two at 24 hours (except for the MSIV release paths to the environment, where the reduction occurred at 11 hours (steamline with two MSIVs closed) or at 13 hours (steamline with one MSIV open). X/Qs at the control room, EAB, and LPZ were as in the STARDOSE calculation.

#### Edit Time Issue

In order to retrieve accurate dose results, it appeared essential to request a high number of time edits when preparing the RADTRAD input files, especially in the first few hours into the event. In similar calculations it has been found that for the failed steam line release pathway (biggest contributor to the control room dose) using different set of requested edit times in the first four hours into the event (during which most of the changes in input parameters take place) resulted in differences in dose results that appeared significant (several percent).

Since the RADTRAD output file size is not too big (except when requesting detailed information in control volumes), the choice was made to use one edit time every 0.05 hour in the first four hours of the analysis.

Edit Time Frequency chosen for the RADTRAD runs:

Table C-1 – RADTRAD Edit Times

Time Frame	Elapsed Time Between Edits
0 – 4 hr	0.05 hr
4 – 8 hr	0.5 hr
8 – 24 hr	1 hr
24 – 48 hr	2 hr
48 – 720 hr	24 hr

To complete the check calculation, RADTRAD was run seven times as shown in Table C-2

Table C-2 – RADTRAD Cases

Run Number	STARDOSE path	Nuclide Inventory File	Initial Inventory Location	Release Pathways to the Environment								CR X/Q Set
				Failed SL		Intact SLs		RB Bypass		SGTS Release		
				From	To	From	To	From	To	From	To	
1	DW-ENV 1	8pt7oc60.nif	DW	DW	Enviro	DW	Dummy	DW	Dummy	RB	Dummy	TB
2	DW-ENV 2	oc60.nif	DW	DW	Dummy	DW	Dummy	DW	Enviro	RB	Dummy	TB
3	SL-ENV	153oc60.nif	DW	DW	Dummy	DW	Enviro	DW&WW	Dummy	RB	Dummy	TB
4	DW-ENV 3	oc60.nif	DW	DW	Dummy	DW	Dummy	DW	Enviro	RB	Dummy	Yard
5	WW-ENV	oc60.nif	DW	DW	Dummy	DW	Dummy	WW	Enviro	RB	Dummy	Yard
6	RB-ENV	oc60.nif	SP	DW	Dummy	DW	Dummy	DW&WW	Dummy	RB	Enviro	Stack
7	RB-ENV	ocesf.nif	SP	DW	Dummy	DW	Dummy	DW&WW	Dummy	RB	Enviro	Stack

Input and output files related to these RADTRAD runs are provided at the end of this report as follows:

- Appendix C1 This appendix provides the Nuclide Information Files (oc60.nif, 8pt7oc60.nif, 153oc60.nif, & ocesf.nif)
- Appendix C2 This appendix provides the file detailing the Release Fraction and Timing for OCNGS (oc.rft)
- Appendix C3 This appendix provides the default Dose Conversion Factor file (oc60.inp)
- Appendix C4 This appendix provides the \*\*\*.psf main input file for each run
- Appendix C5 This appendix provides excerpts from the RADTRAD output files
- Appendix C6 This appendix provides a comparison of the 8.7 and 13 source activities with those generated in the Microshield MS7 code.

Results

To obtain the final control room and off-site TEDEs, one needs to add up the TEDEs of all seven single runs.

Table C-3 summarizes the 30-day (720 hours) integrated doses at the control room LPZ, and the worst 2 hour EAB dose from each of the seven runs (all doses in rem).

Table C-3 RADTRAD results

Run number	CR whole body	CR TEDE	LPZ TEDE	EAB whole body	EAB TEDE
1	0.051	1.946	0.078	0.000	0.000
2	0.028	0.195	0.069	0.303	0.318
3	0.015	0.478	0.033	0.000	0.000
4	0.021	0.153	0.047	0.203	0.217
5	0.083	0.547	0.160	0.611	0.646
6	0.091	0.219	0.218	0.800	0.829
7	0.009	0.669	0.024	0.027	0.073
Total	0.298	4.208	0.630	1.944	2.083

The total control room TEDE is 4.84 rem (including 0.6 rem due to external whole body dose plus 10% of the internal whole body dose), which agrees well with the STARDOSE value of 4.63 rem obtained in the main calculation.

Conclusions

The two codes give comparable control room doses. It is concluded that the RADTRAD calculations serve as a satisfactory check on the STARDOSE results. Both calculations yield control room TEDEs that are below the limit of 5 rem.

Reference:

C1. RADTRAD version 3.03, USNRC, October 2002

**Appendix C1. Oyster Creek RADTRAD nuclide inventory (.nif) files****File oc60.nif**

```
Nuclide Inventory Name:
OC general
Power Level:
  0.1000E+01
Nuclides:
  60
Nuclide 001:
Kr-83m
  1
  0.6696E+04
  0.8300E+02
  0.4150E+04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 002:
Kr-85m
  1
  0.1612800000E+05
  0.8500E+02
  6.94E+03
Kr-85     0.2100E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 003:
Kr-85
  1
  0.338613048E+09
  0.8500E+02
  4.03E+02
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 004:
Kr-87
  1
  0.4578000000E+04
  0.8700E+02
  1.29E+04
Rb-87     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 005:
Kr-88
  1
  0.1022400000E+05
  0.8800E+02
  1.83E+04
Rb-88     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 006:
```

Kr-89  
1  
0.1896E+03  
0.8900E+02  
3.98E+04  
Sr-89 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 007:  
Rb-86  
3  
0.1612224000E+07  
0.8600E+02  
0.403E+02  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 008:  
Sr-89  
5  
0.4363200000E+07  
0.8900E+02  
3.99E+03  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 009:  
Sr-90  
5  
0.9189573120E+09  
0.9000E+02  
6.12E+02  
Y-90 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 010:  
Sr-91  
5  
0.3420000000E+05  
0.9100E+02  
1.75E+04  
Y-91m 0.5800E+00  
Y-91 0.4200E+00  
none 0.0000E+00  
Nuclide 011:  
Sr-92  
5  
0.9756000000E+04  
0.9200E+02  
2.61E+04  
Y-92 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 012:  
Y-90  
9

0.2304000000E+06  
0.9000E+02  
3.42E+03  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 013:  
Y-91  
9  
0.5055264000E+07  
0.9100E+02  
3.27E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 014:  
Y-92  
9  
0.1274400000E+05  
0.9200E+02  
3.37E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 015:  
Y-93  
9  
0.3636000000E+05  
0.9300E+02  
3.87E+04  
Zr-93 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 016:  
Zr-95  
9  
0.5527872000E+07  
0.9500E+02  
4.42E+04  
Nb-95m 0.7000E-02  
Nb-95 0.9900E+00  
none 0.0000E+00  
Nuclide 017:  
Zr-97  
9  
0.6084000000E+05  
0.9700E+02  
4.37E+04  
Nb-97m 0.9500E+00  
Nb-97 0.5300E-01  
none 0.0000E+00  
Nuclide 018:  
Nb-95  
9  
0.3036960000E+07  
0.9500E+02

4.46E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 019:  
Mo-99  
7  
0.2376000000E+06  
0.9900E+02  
4.70E+04  
Tc-99m 0.8800E+00  
Tc-99 0.1200E+00  
none 0.0000E+00  
Nuclide 020:  
Tc-99m  
7  
0.2167200000E+05  
0.9900E+02  
4.11E+04  
Tc-99 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 021:  
Ru-103  
7  
0.3393792000E+07  
0.1030E+03  
3.98E+04  
Rh-103m 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 022:  
Ru-105  
7  
0.1598400000E+05  
0.1050E+03  
2.57E+04  
Rh-105 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 023:  
Ru-106  
7  
0.3181248000E+08  
0.1060E+03  
1.41E+04  
Rh-106 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 024:  
Rh-105  
7  
0.1272960000E+06  
0.1050E+03  
2.49E+04  
none 0.0000E+00

```
none      0.0000E+00
none      0.0000E+00
Nuclide 025:
Sb-127
  4
  0.3326400000E+06
  0.1270E+03
  2.33E+03
Te-127m   0.1800E+00
Te-127    0.8200E+00
none      0.0000E+00
Nuclide 026:
Sb-129
  4
  0.1555200000E+05
  0.1290E+03
  0.803E+04
Te-129m   0.2200E+00
Te-129    0.7700E+00
none      0.0000E+00
Nuclide 027:
Te-127
  4
  0.3366000000E+05
  0.1270E+03
  2.32E+03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 028:
Te-127m
  4
  0.9417600000E+07
  0.1270E+03
  3.12E+02
Te-127    0.9800E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 029:
Te-129
  4
  0.4176000000E+04
  0.1290E+03
  7.93E+03
I-129     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 030:
Te-129m
  4
  0.2903040000E+07
  0.1290E+03
  1.21E+03
Te-129    0.6500E+00
I-129     0.3500E+00
none      0.0000E+00
```

## Nuclide 031:

Te-131m

4

0.1080000000E+06

0.1310E+03

3.77E+03

Te-131 0.2200E+00

I-131 0.7800E+00

none 0.0000E+00

## Nuclide 032:

Te-132

4

0.2815200000E+06

0.1320E+03

3.60E+04

I-132 0.1000E+01

none 0.0000E+00

none 0.0000E+00

## Nuclide 033:

I-131

2

0.6946560000E+06

0.1310E+03

2.51E+04

Xe-131m 0.1100E-01

none 0.0000E+00

none 0.0000E+00

## Nuclide 034:

I-132

2

0.8280000000E+04

0.1320E+03

3.66E+04

none 0.0000E+00

none 0.0000E+00

none 0.0000E+00

## Nuclide 035:

I-133

2

0.7488000000E+05

0.1330E+03

5.18E+04

Xe-133m 0.2900E-01

Xe-133 0.9700E+00

none 0.0000E+00

## Nuclide 036:

I-134

2

0.3156000000E+04

0.1340E+03

5.60E+04

none 0.0000E+00

none 0.0000E+00

none 0.0000E+00

## Nuclide 037:

I-135

```
2
0.2379600000E+05
0.1350E+03
4.82E+04
Xe-135m 0.1500E+00
Xe-135 0.8500E+00
none 0.0000E+00
Nuclide 038:
Xe-133
1
0.4531680000E+06
0.1330E+03
5.23E+04
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 039:
Xe-133m
1
0.1926720000E+06
0.1330E+03
1.38E+03
Xe-133 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 040:
Xe-135
1
0.3272400000E+05
0.1350E+03
1.81E+04
Cs-135 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 041:
Xe-135m
1
0.91800000E+03
0.1350E+03
1.56E+04
Xe-135 0.9940E+00
Cs-135 0.6000E-03
none 0.0000E+00
Nuclide 042:
Xe-137
1
0.2304000000E+03
0.1370E+03
5.10E+04
Cs-137 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 043:
Xe-138
1
0.85200000E+03
```

```
0.1380E+03
4.78E+04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 044:
Cs-134
3
0.6507177120E+08
0.1340E+03
4.83E+03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 045:
Cs-136
3
0.1131840000E+07
0.1360E+03
1.39E+03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 046:
Cs-137
3
0.9467280000E+09
0.1370E+03
4.56E+03
Ba-137m  0.9500E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 047:
Ba-137m
3
0.15300000E+03
0.1370E+03
1.81E+03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 048:
Ba-139
6
0.4962000000E+04
0.1390E+03
4.61E+04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 049:
Ba-140
6
0.1100736000E+07
0.1400E+03
4.51E+04
```

La-140 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 050:  
La-140  
9  
0.1449792000E+06  
0.1400E+03  
4.63E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 051:  
La-141  
9  
0.1414800000E+05  
0.1410E+03  
4.26E+04  
Ce-141 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 052:  
La-142  
9  
0.5550000000E+04  
0.1420E+03  
4.12E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 053:  
Ce-141  
8  
0.2808086400E+07  
0.1410E+03  
4.31E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 054:  
Ce-143  
8  
0.1188000000E+06  
0.1430E+03  
3.98E+04  
Pr-143 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 055:  
Ce-144  
8  
0.2456352000E+08  
0.1440E+03  
3.48E+04  
Pr-144m 0.1800E-01  
Pr-144 0.9800E+00

```
none      0.0000E+00
Nuclide 056:
Pr-143
  9
  0.1171584000E+07
  0.1430E+03
  3.97E+04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 057:
Nd-147
  9
  0.9486720000E+06
  0.1470E+03
  1.68E+04
Pm-147   0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 058:
Np-239
  8
  0.2034720000E+06
  0.2390E+03
  5.07E+05
Pu-239   0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 059:
Pu-238
  8
  0.2768863824E+10
  0.2380E+03
  1.04E+02
U-234    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 060:
Pu-239
  8
  0.7594336440E+12
  0.2390E+03
  1.43E+01
U-235    0.1000E+01
none      0.0000E+00
none      0.0000E+00
End of Nuclear Inventory File
```

**File ocesf.nif**

Nuclide Inventory Name:

OC general

Power Level:

0.1000E+01

Nuclides:

60

Nuclide 001:

Kr-83m

1

0.6696E+04

0.8300E+02

0.0000E+00

none 0.0000E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 002:

Kr-85m

1

0.1612800000E+05

0.8500E+02

0.0000E+00

Kr-85 0.2100E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 003:

Kr-85

1

0.338613048E+09

0.8500E+02

0.0000E+00

none 0.0000E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 004:

Kr-87

1

0.4578000000E+04

0.8700E+02

0.0000E+00

Rb-87 0.1000E+01

none 0.0000E+00

none 0.0000E+00

Nuclide 005:

Kr-88

1

0.1022400000E+05

0.8800E+02

0.0000E+00

Rb-88 0.1000E+01

none 0.0000E+00

none 0.0000E+00

Nuclide 006:

Kr-89

1

0.1896E+03  
0.8900E+02  
0.0000E+00  
Sr-89 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 007:  
Rb-86  
3  
0.1612224000E+07  
0.8600E+02  
0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 008:  
Sr-89  
5  
0.4363200000E+07  
0.8900E+02  
0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 009:  
Sr-90  
5  
0.9189573120E+09  
0.9000E+02  
0.0000E+00  
Y-90 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 010:  
Sr-91  
5  
0.3420000000E+05  
0.9100E+02  
0.0000E+00  
Y-91m 0.5800E+00  
Y-91 0.4200E+00  
none 0.0000E+00  
Nuclide 011:  
Sr-92  
5  
0.9756000000E+04  
0.9200E+02  
0.0000E+00  
Y-92 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 012:  
Y-90  
9  
0.2304000000E+06  
0.9000E+02

```
0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 013:
Y-91
  9
  0.5055264000E+07
  0.9100E+02
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 014:
Y-92
  9
  0.1274400000E+05
  0.9200E+02
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 015:
Y-93
  9
  0.3636000000E+05
  0.9300E+02
  0.0000E+00
Zr-93     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 016:
Zr-95
  9
  0.5527872000E+07
  0.9500E+02
  0.0000E+00
Nb-95m    0.7000E-02
Nb-95     0.9900E+00
none      0.0000E+00
Nuclide 017:
Zr-97
  9
  0.6084000000E+05
  0.9700E+02
  0.0000E+00
Nb-97m    0.9500E+00
Nb-97     0.5300E-01
none      0.0000E+00
Nuclide 018:
Nb-95
  9
  0.3036960000E+07
  0.9500E+02
  0.0000E+00
none      0.0000E+00
```

```
none      0.0000E+00
none      0.0000E+00
Nuclide 019:
Mo-99
  7
  0.2376000000E+06
  0.9900E+02
  0.0000E+00
Tc-99m   0.8800E+00
Tc-99    0.1200E+00
none     0.0000E+00
Nuclide 020:
Tc-99m
  7
  0.2167200000E+05
  0.9900E+02
  0.0000E+00
Tc-99    0.1000E+01
none     0.0000E+00
none     0.0000E+00
Nuclide 021:
Ru-103
  7
  0.3393792000E+07
  0.1030E+03
  0.0000E+00
Rh-103m  0.1000E+01
none     0.0000E+00
none     0.0000E+00
Nuclide 022:
Ru-105
  7
  0.1598400000E+05
  0.1050E+03
  0.0000E+00
Rh-105   0.1000E+01
none     0.0000E+00
none     0.0000E+00
Nuclide 023:
Ru-106
  7
  0.3181248000E+08
  0.1060E+03
  0.0000E+00
Rh-106   0.1000E+01
none     0.0000E+00
none     0.0000E+00
Nuclide 024:
Rh-105
  7
  0.1272960000E+06
  0.1050E+03
  0.0000E+00
none     0.0000E+00
none     0.0000E+00
none     0.0000E+00
```

Nuclide 025:

Sb-127

4

0.3326400000E+06

0.1270E+03

0.0000E+00

Te-127m 0.1800E+00

Te-127 0.8200E+00

none 0.0000E+00

Nuclide 026:

Sb-129

4

0.1555200000E+05

0.1290E+03

0.0000E+00

Te-129m 0.2200E+00

Te-129 0.7700E+00

none 0.0000E+00

Nuclide 027:

Te-127

4

0.3366000000E+05

0.1270E+03

0.0000E+00

none 0.0000E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 028:

Te-127m

4

0.9417600000E+07

0.1270E+03

0.0000E+00

Te-127 0.9800E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 029:

Te-129

4

0.4176000000E+04

0.1290E+03

0.0000E+00

I-129 0.1000E+01

none 0.0000E+00

none 0.0000E+00

Nuclide 030:

Te-129m

4

0.2903040000E+07

0.1290E+03

0.0000E+00

Te-129 0.6500E+00

I-129 0.3500E+00

none 0.0000E+00

Nuclide 031:

Te-131m

4  
0.1080000000E+06  
0.1310E+03  
0.0000E+00  
Te-131 0.2200E+00  
I-131 0.7800E+00  
none 0.0000E+00  
Nuclide 032:  
Te-132  
4  
0.2815200000E+06  
0.1320E+03  
0.0000E+00  
I-132 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 033:  
I-131  
2  
0.6946560000E+06  
0.1310E+03  
5.02E+04  
Xe-131m 0.1100E-01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 034:  
I-132  
2  
0.8280000000E+04  
0.1320E+03  
7.32E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 035:  
I-133  
2  
0.7488000000E+05  
0.1330E+03  
1.04E+05  
Xe-133m 0.2900E-01  
Xe-133 0.9700E+00  
none 0.0000E+00  
Nuclide 036:  
I-134  
2  
0.3156000000E+04  
0.1340E+03  
1.12E+05  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 037:  
I-135  
2  
0.2379600000E+05

```
0.1350E+03
9.64E+04
Xe-135m 0.1500E+00
Xe-135 0.8500E+00
none 0.0000E+00
Nuclide 038:
Xe-133
1
0.4531680000E+06
0.1330E+03
0.0000E+00
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 039:
Xe-133m
1
0.1926720000E+06
0.1330E+03
0.0000E+00
Xe-133 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 040:
Xe-135
1
0.3272400000E+05
0.1350E+03
0.0000E+00
Cs-135 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 041:
Xe-135m
1
0.91800000E+03
0.1350E+03
0.0000E+00
Xe-135 0.9940E+00
Cs-135 0.6000E-03
none 0.0000E+00
Nuclide 042:
Xe-137
1
0.2304000000E+03
0.1370E+03
0.0000E+00
Cs-137 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 043:
Xe-138
1
0.85200000E+03
0.1380E+03
0.0000E+00
```

```
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 044:
Cs-134
  3
  0.6507177120E+08
  0.1340E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 045:
Cs-136
  3
  0.1131840000E+07
  0.1360E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 046:
Cs-137
  3
  0.9467280000E+09
  0.1370E+03
  0.0000E+00
Ba-137m  0.9500E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 047:
Ba-137m
  3
  0.15300000E+03
  0.1370E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 048:
Ba-139
  6
  0.4962000000E+04
  0.1390E+03
  0.0000E+00
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 049:
Ba-140
  6
  0.1100736000E+07
  0.1400E+03
  0.0000E+00
La-140   0.1000E+01
none      0.0000E+00
```

none 0.0000E+00  
Nuclide 050:  
La-140  
9  
0.1449792000E+06  
0.1400E+03  
0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 051:  
La-141  
9  
0.1414800000E+05  
0.1410E+03  
0.0000E+00  
Ce-141 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 052:  
La-142  
9  
0.5550000000E+04  
0.1420E+03  
0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 053:  
Ce-141  
8  
0.2808086400E+07  
0.1410E+03  
0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 054:  
Ce-143  
8  
0.1188000000E+06  
0.1430E+03  
0.0000E+00  
Pr-143 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 055:  
Ce-144  
8  
0.2456352000E+08  
0.1440E+03  
0.0000E+00  
Pr-144m 0.1800E-01  
Pr-144 0.9800E+00  
none 0.0000E+00  
Nuclide 056:

Pr-143  
9  
0.1171584000E+07  
0.1430E+03  
0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 057:  
Nd-147  
9  
0.9486720000E+06  
0.1470E+03  
0.0000E+00  
Pm-147 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 058:  
Np-239  
8  
0.2034720000E+06  
0.2390E+03  
0.0000E+00  
Pu-239 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 059:  
Pu-238  
8  
0.2768863824E+10  
0.2380E+03  
0.0000E+00  
U-234 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 060:  
Pu-239  
8  
0.7594336440E+12  
0.2390E+03  
0.0000E+00  
U-235 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
End of Nuclear Inventory File

**File 8pt7oc60.nif**

Nuclide Inventory Name:

OC general

Power Level:

0.1000E+01

Nuclides:

60

Nuclide 001:

Kr-83m

1

0.6696E+04

0.8300E+02

1.6000E+02

none 0.0000E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 002:

Kr-85m

1

0.1612800000E+05

0.8500E+02

1.76E+03

Kr-85 0.2100E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 003:

Kr-85

1

0.338613048E+09

0.8500E+02

4.03E+02

none 0.0000E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 004:

Kr-87

1

0.4578000000E+04

0.8700E+02

1.10E+02

Rb-87 0.1000E+01

none 0.0000E+00

none 0.0000E+00

Nuclide 005:

Kr-88

1

0.1022400000E+05

0.8800E+02

2.12E+03

Rb-88 0.1000E+01

none 0.0000E+00

none 0.0000E+00

Nuclide 006:

Kr-89

1

0.1896E+03  
0.8900E+02  
4.57E-16  
Sr-89 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 007:  
Rb-86  
3  
0.1612224000E+07  
0.8600E+02  
3.98E+01  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 008:  
Sr-89  
5  
0.4363200000E+07  
0.8900E+02  
2.53E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 009:  
Sr-90  
5  
0.9189573120E+09  
0.9000E+02  
3.33E+03  
Y-90 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 010:  
Sr-91  
5  
0.3420000000E+05  
0.9100E+02  
1.68E+04  
Y-91m 0.5800E+00  
Y-91 0.4200E+00  
none 0.0000E+00  
Nuclide 011:  
Sr-92  
5  
0.9756000000E+04  
0.9200E+02  
3.42E+03  
Y-92 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 012:  
Y-90  
9  
0.2304000000E+06  
0.9000E+02

3.41E+03  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 013:  
Y-91  
9  
0.5055264000E+07  
0.9100E+02  
3.27E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 014:  
Y-92  
9  
0.1274400000E+05  
0.9200E+02  
1.42E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 015:  
Y-93  
9  
0.3636000000E+05  
0.9300E+02  
2.13E+04  
Zr-93 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 016:  
Zr-95  
9  
0.5527872000E+07  
0.9500E+02  
4.40E+04  
Nb-95m 0.7000E-02  
Nb-95 0.9900E+00  
none 0.0000E+00  
Nuclide 017:  
Zr-97  
9  
0.6084000000E+05  
0.9700E+02  
3.07E+04  
Nb-97m 0.9500E+00  
Nb-97 0.5300E-01  
none 0.0000E+00  
Nuclide 018:  
Nb-95  
9  
0.3036960000E+07  
0.9500E+02  
4.46E+04  
none 0.0000E+00

```
none      0.0000E+00
none      0.0000E+00
Nuclide 019:
Mo-99
  7
  0.2376000000E+06
  0.9900E+02
  4.30E+04
Tc-99m    0.8800E+00
Tc-99     0.1200E+00
none      0.0000E+00
Nuclide 020:
Tc-99m
  7
  0.2167200000E+05
  0.9900E+02
  4.33E+04
Tc-99     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 021:
Ru-103
  7
  0.3393792000E+07
  0.1030E+03
  3.96E+04
Rh-103m   0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 022:
Ru-105
  7
  0.1598400000E+05
  0.1050E+03
  6.86E+03
Rh-105    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 023:
Ru-106
  7
  0.3181248000E+08
  0.1060E+03
  1.41E+04
Rh-106    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 024:
Rh-105
  7
  0.1272960000E+06
  0.1050E+03
  2.32E+04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
```

Nuclide 025:

Sb-127

4

0.3326400000E+06

0.1270E+03

2.18E+03

Te-127m 0.1800E+00

Te-127 0.8200E+00

none 0.0000E+00

Nuclide 026:

Sb-129

4

0.1555200000E+05

0.1290E+03

2.01E+03

Te-129m 0.2200E+00

Te-129 0.7700E+00

none 0.0000E+00

Nuclide 027:

Te-127

4

0.3366000000E+05

0.1270E+03

2.29E+03

none 0.0000E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 028:

Te-127m

4

0.9417600000E+07

0.1270E+03

3.11E+02

Te-127 0.9800E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 029:

Te-129

4

0.4176000000E+04

0.1290E+03

2.78E+03

I-129 0.1000E+01

none 0.0000E+00

none 0.0000E+00

Nuclide 030:

Te-129m

4

0.2903040000E+07

0.1290E+03

1.20E+03

Te-129 0.6500E+00

I-129 0.3500E+00

none 0.0000E+00

Nuclide 031:

Te-131m

4  
0.1080000000E+06  
0.1310E+03  
3.08E+03  
Te-131 0.2200E+00  
I-131 0.7800E+00  
none 0.0000E+00  
Nuclide 032:  
Te-132  
4  
0.2815200000E+06  
0.1320E+03  
3.33E+04  
I-132 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 033:  
I-131  
2  
0.6946560000E+06  
0.1310E+03  
2.43E+04  
Xe-131m 0.1100E-01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 034:  
I-132  
2  
0.8280000000E+04  
0.1320E+03  
3.43E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 035:  
I-133  
2  
0.7488000000E+05  
0.1330E+03  
3.88E+04  
Xe-133m 0.2900E-01  
Xe-133 0.9700E+00  
none 0.0000E+00  
Nuclide 036:  
I-134  
2  
0.3156000000E+04  
0.1340E+03  
5.19E+01  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 037:  
I-135  
2  
0.2379600000E+05

```
0.1350E+03
1.97E+04
Xe-135m 0.1500E+00
Xe-135 0.8500E+00
none 0.0000E+00
Nuclide 038:
Xe-133
1
0.4531680000E+06
0.1330E+03
5.20E+04
none 0.0000E+00
none 0.0000E+00
none 0.0000E+00
Nuclide 039:
Xe-133m
1
0.1926720000E+06
0.1330E+03
1.24E+03
Xe-133 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 040:
Xe-135
1
0.3272400000E+05
0.1350E+03
2.40E+04
Cs-135 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 041:
Xe-135m
1
0.91800000E+03
0.1350E+03
1.34E-06
Xe-135 0.9940E+00
Cs-135 0.6000E-03
none 0.0000E+00
Nuclide 042:
Xe-137
1
0.2304000000E+03
0.1370E+03
2.26E-16
Cs-137 0.1000E+01
none 0.0000E+00
none 0.0000E+00
Nuclide 043:
Xe-138
1
0.85200000E+03
0.1380E+03
2.69E-05
```

```
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 044:
Cs-134
  3
  0.6507177120E+08
  0.1340E+03
  4.83E+03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 045:
Cs-136
  3
  0.1131840000E+07
  0.1360E+03
  1.36E+03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 046:
Cs-137
  3
  0.9467280000E+09
  0.1370E+03
  4.56E+03
Ba-137m  0.9500E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 047:
Ba-137m
  3
  0.15300000E+03
  0.1370E+03
  4.56E+03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 048:
Ba-139
  6
  0.4962000000E+04
  0.1390E+03
  5.93E+02
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 049:
Ba-140
  6
  0.1100736000E+07
  0.1400E+03
  4.42E+04
La-140   0.1000E+01
none      0.0000E+00
```

```
none      0.0000E+00
Nuclide 050:
La-140
  9
  0.1449792000E+06
  0.1400E+03
  4.61E+04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 051:
La-141
  9
  0.1414800000E+05
  0.1410E+03
  9.07E+03
Ce-141   0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 052:
La-142
  9
  0.5550000000E+04
  0.1420E+03
  7.96E+02
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 053:
Ce-141
  8
  0.2808086400E+07
  0.1410E+03
  4.29E+04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 054:
Ce-143
  8
  0.1188000000E+06
  0.1430E+03
  3.30E+04
Pr-143   0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 055:
Ce-144
  8
  0.2456352000E+08
  0.1440E+03
  3.48E+04
Pr-144m  0.1800E-01
Pr-144   0.9800E+00
none      0.0000E+00
Nuclide 056:
```

```
Pr-143
  9
  0.1171584000E+07
  0.1430E+03
  3.96E+04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 057:
Nd-147
  9
  0.9486720000E+06
  0.1470E+03
  1.64E+04
Pm-147    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 058:
Np-239
  8
  0.2034720000E+06
  0.2390E+03
  4.55E+05
Pu-239    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 059:
Pu-238
  8
  0.2768863824E+10
  0.2380E+03
  1.04E+02
U-234     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 060:
Pu-239
  8
  0.7594336440E+12
  0.2390E+03
  1.43E+01
U-235     0.1000E+01
none      0.0000E+00
none      0.0000E+00
End of Nuclear Inventory File
```

**File 153oc60.nif**

Nuclide Inventory Name:

OC general

Power Level:

0.1000E+01

Nuclides:

60

Nuclide 001:

Kr-83m

1

0.6696E+04

0.8300E+02

3.19E+01

none 0.0000E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 002:

Kr-85m

1

0.1612800000E+05

0.8500E+02

8.90E+02

Kr-85 0.2100E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 003:

Kr-85

1

0.338613048E+09

0.8500E+02

4.03E+02

none 0.0000E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 004:

Kr-87

1

0.4578000000E+04

0.8700E+02

1.05E+01

Rb-87 0.1000E+01

none 0.0000E+00

none 0.0000E+00

Nuclide 005:

Kr-88

1

0.1022400000E+05

0.8800E+02

7.31E+02

Rb-88 0.1000E+01

none 0.0000E+00

none 0.0000E+00

Nuclide 006:

Kr-89

1

0.1896E+03  
0.8900E+02  
6.50E-18  
Sr-89 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 007:  
Rb-86  
3  
0.1612224000E+07  
0.8600E+02  
3.95E+01  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 008:  
Sr-89  
5  
0.4363200000E+07  
0.8900E+02  
2.52E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 009:  
Sr-90  
5  
0.9189573120E+09  
0.9000E+02  
3.33E+03  
Y-90 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 010:  
Sr-91  
5  
0.3420000000E+05  
0.9100E+02  
1.23E+04  
Y-91m 0.5800E+00  
Y-91 0.4200E+00  
none 0.0000E+00  
Nuclide 011:  
Sr-92  
5  
0.9756000000E+04  
0.9200E+02  
1.11E+03  
Y-92 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 012:  
Y-90  
9  
0.2304000000E+06  
0.9000E+02

3.41E+03  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 013:  
Y-91  
9  
0.5055264000E+07  
0.9100E+02  
3.26E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 014:  
Y-92  
9  
0.1274400000E+05  
0.9200E+02  
7.26E+03  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 015:  
Y-93  
9  
0.3636000000E+05  
0.9300E+02  
1.58E+04  
Zr-93 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 016:  
Zr-95  
9  
0.5527872000E+07  
0.9500E+02  
4.39E+04  
Nb-95m 0.7000E-02  
Nb-95 0.9900E+00  
none 0.0000E+00  
Nuclide 017:  
Zr-97  
9  
0.6084000000E+05  
0.9700E+02  
2.58E+04  
Nb-97m 0.9500E+00  
Nb-97 0.5300E-01  
none 0.0000E+00  
Nuclide 018:  
Nb-95  
9  
0.3036960000E+07  
0.9500E+02  
4.46E+04  
none 0.0000E+00

```
none      0.0000E+00
none      0.0000E+00
Nuclide 019:
Mo-99
  7
  0.2376000000E+06
  0.9900E+02
  4.11E+04
Tc-99m    0.8800E+00
Tc-99     0.1200E+00
none      0.0000E+00
Nuclide 020:
Tc-99m
  7
  0.2167200000E+05
  0.9900E+02
  4.28E+04
Tc-99     0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 021:
Ru-103
  7
  0.3393792000E+07
  0.1030E+03
  3.94E+04
Rh-103m   0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 022:
Ru-105
  7
  0.1598400000E+05
  0.1050E+03
  3.57E+03
Rh-105    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 023:
Ru-106
  7
  0.3181248000E+08
  0.1060E+03
  1.41E+04
Rh-106    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 024:
Rh-105
  7
  0.1272960000E+06
  0.1050E+03
  2.17E+04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
```

Nuclide 025:

Sb-127

4

0.3326400000E+06

0.1270E+03

2.12E+03

Te-127m 0.1800E+00

Te-127 0.8200E+00

none 0.0000E+00

Nuclide 026:

Sb-129

4

0.1555200000E+05

0.1290E+03

1.01E+03

Te-129m 0.2200E+00

Te-129 0.7700E+00

none 0.0000E+00

Nuclide 027:

Te-127

4

0.3366000000E+05

0.1270E+03

2.25E+03

none 0.0000E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 028:

Te-127m

4

0.9417600000E+07

0.1270E+03

3.11E+02

Te-127 0.9800E+00

none 0.0000E+00

none 0.0000E+00

Nuclide 029:

Te-129

4

0.4176000000E+04

0.1290E+03

1.41E+03

I-129 0.1000E+01

none 0.0000E+00

none 0.0000E+00

Nuclide 030:

Te-129m

4

0.2903040000E+07

0.1290E+03

1.20E+03

Te-129 0.6500E+00

I-129 0.3500E+00

none 0.0000E+00

Nuclide 031:

Te-131m

4  
0.1080000000E+06  
0.1310E+03  
2.79E+03  
Te-131 0.2200E+00  
I-131 0.7800E+00  
none 0.0000E+00  
Nuclide 032:  
Te-132  
4  
0.2815200000E+06  
0.1320E+03  
3.20E+04  
I-132 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 033:  
I-131  
2  
0.6946560000E+06  
0.1310E+03  
2.41E+04  
Xe-131m 0.1100E-01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 034:  
I-132  
2  
0.8280000000E+04  
0.1320E+03  
3.30E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 035:  
I-133  
2  
0.7488000000E+05  
0.1330E+03  
3.37E+04  
Xe-133m 0.2900E-01  
Xe-133 0.9700E+00  
none 0.0000E+00  
Nuclide 036:  
I-134  
2  
0.3156000000E+04  
0.1340E+03  
1.64E+00  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 037:  
I-135  
2  
0.2379600000E+05

0.1350E+03  
1.26E+04  
Xe-135m 0.1500E+00  
Xe-135 0.8500E+00  
none 0.0000E+00  
Nuclide 038:  
Xe-133  
1  
0.4531680000E+06  
0.1330E+03  
5.16E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 039:  
Xe-133m  
1  
0.1926720000E+06  
0.1330E+03  
1.17E+03  
Xe-133 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 040:  
Xe-135  
1  
0.3272400000E+05  
0.1350E+03  
2.17E+04  
Cs-135 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 041:  
Xe-135m  
1  
0.91800000E+03  
0.1350E+03  
1.42E-11  
Xe-135 0.9940E+00  
Cs-135 0.6000E-03  
none 0.0000E+00  
Nuclide 042:  
Xe-137  
1  
0.2304000000E+03  
0.1370E+03  
1.29E-17  
Cs-137 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 043:  
Xe-138  
1  
0.85200000E+03  
0.1380E+03  
7.22E-10

```
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 044:
Cs-134
  3
  0.6507177120E+08
  0.1340E+03
  4.83E+03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 045:
Cs-136
  3
  0.1131840000E+07
  0.1360E+03
  1.35E+03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 046:
Cs-137
  3
  0.9467280000E+09
  0.1370E+03
  4.56E+03
Ba-137m  0.9500E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 047:
Ba-137m
  3
  0.15300000E+03
  0.1370E+03
  4.56E+03
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 048:
Ba-139
  6
  0.4962000000E+04
  0.1390E+03
  6.90E+01
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 049:
Ba-140
  6
  0.1100736000E+07
  0.1400E+03
  4.38E+04
La-140   0.1000E+01
none      0.0000E+00
```

```
none      0.0000E+00
Nuclide 050:
La-140
  9
  0.1449792000E+06
  0.1400E+03
  4.59E+04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 051:
La-141
  9
  0.1414800000E+05
  0.1410E+03
  4.22E+03
Ce-141    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 052:
La-142
  9
  0.5550000000E+04
  0.1420E+03
  1.13E+02
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 053:
Ce-141
  8
  0.2808086400E+07
  0.1410E+03
  4.28E+04
none      0.0000E+00
none      0.0000E+00
none      0.0000E+00
Nuclide 054:
Ce-143
  8
  0.1188000000E+06
  0.1430E+03
  3.00E+04
Pr-143    0.1000E+01
none      0.0000E+00
none      0.0000E+00
Nuclide 055:
Ce-144
  8
  0.2456352000E+08
  0.1440E+03
  3.48E+04
Pr-144m   0.1800E-01
Pr-144    0.9800E+00
none      0.0000E+00
Nuclide 056:
```

Pr-143  
9  
0.1171584000E+07  
0.1430E+03  
3.96E+04  
none 0.0000E+00  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 057:  
Nd-147  
9  
0.9486720000E+06  
0.1470E+03  
1.63E+04  
Pm-147 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 058:  
Np-239  
8  
0.2034720000E+06  
0.2390E+03  
4.32E+05  
Pu-239 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 059:  
Pu-238  
8  
0.2768863824E+10  
0.2380E+03  
1.04E+02  
U-234 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
Nuclide 060:  
Pu-239  
8  
0.7594336440E+12  
0.2390E+03  
1.43E+01  
U-235 0.1000E+01  
none 0.0000E+00  
none 0.0000E+00  
End of Nuclear Inventory File

**Appendix C2. Oyster Creek RADTRAD release (.rft) file**

Release Fraction and Timing Name:  
Oyster Creek NUREG-1465  
Duration (h): Design Basis Accident  
0.008E+00 0.5000E+00 0.1500E+01 0.0000E+00  
Noble Gases:  
0.0000E+00 0.5000E-01 0.9500E+00 0.0000E+00  
Iodine:  
0.0000E+00 0.5000E-01 0.2500E+00 0.0000E+00  
Cesium:  
0.0000E+00 0.5000E-01 0.2000E+00 0.0000E+00  
Tellurium:  
0.0000E+00 0.0000E+00 0.5000E-01 0.0000E+00  
Strontium:  
0.0000E+00 0.0000E+00 0.2000E-01 0.0000E+00  
Barium:  
0.0000E+00 0.0000E+00 0.2000E-01 0.0000E+00  
Ruthenium:  
0.0000E+00 0.0000E+00 0.2500E-02 0.0000E+00  
Cerium:  
0.0000E+00 0.0000E+00 0.5000E-03 0.0000E+00  
Lanthanum:  
0.0000E+00 0.0000E+00 0.2000E-03 0.0000E+00  
Non-Radioactive Aerosols (kg):  
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00  
End of Release File

**Appendix C3. Oyster Creek RADTRAD library (.inp) file****File oc60.inp**

FGRDCF 10/24/95 03:24:50 beta-test version 1.10, minor FORTRAN fixes 5/4/95  
 Implicit daughter halflives (m) less than 90 and less than 0.100 of parent  
 9 ORGANS DEFINED IN THIS FILE:

GONADS  
 BREAST  
 LUNGS  
 RED MARR  
 BONE SUR  
 THYROID  
 REMAINDER  
 EFFECTIVE  
 SKIN(FGR)

60 NUCLIDES DEFINED IN THIS FILE:

Kr-83m  
 Kr-85m  
 Kr-85  
 Kr-87  
 Kr-88  
 Kr-89  
 Rb-86 D  
 Sr-89 Y  
 Sr-90 Y  
 Sr-91 Y Including:Y-91m  
 Sr-92 Y  
 Y-90 Y  
 Y-91 Y  
 Y-92 Y  
 Y-93 Y  
 Zr-95 D  
 Zr-97 Y Including:Nb-97m , Including:Nb-97  
 Nb-95 Y  
 Mo-99 Y  
 Tc-99m D  
 Ru-103 Y Including:Rh-103m  
 Ru-105 Y  
 Ru-106 Y Including:Rh-106  
 Rh-105 Y  
 Sb-127 W  
 Sb-129 W  
 Te-127 W  
 Te-127m W  
 Te-129 W  
 Te-129m W Including:Te-129  
 Te-131m W Including:Te-131  
 Te-132 W  
 I-131 D  
 I-132 D  
 I-133 D  
 I-134 D  
 I-135 D Including:Xe-135m  
 Xe-133

Xe-133m  
 Xe-135  
 Xe-135m  
 Xe-137  
 Xe-138  
 Cs-134 D  
 Cs-136 D  
 Cs-137 D Including:Ba-137m  
 Ba-137m  
 Ba-139 D  
 Ba-140 D  
 La-140 W  
 La-141 D  
 La-142 D  
 Ce-141 Y  
 Ce-143 Y  
 Ce-144 Y Including:Pr-144m, Including:Pr-144  
 Pr-143 Y  
 Nd-147 Y  
 Np-239 W  
 Pu-238 Y  
 Pu-239 Y

	CLOUDSHINE	GROUND SHINE 8HR	GROUND SHINE 7DAY	GROUND SHINE RATE	INHALED ACUTE	INHALED CHRONIC	INGESTION
--	------------	---------------------	----------------------	----------------------	------------------	--------------------	-----------

Kr-83m							
GONADS	7.310E-15	2.594E-12	3.653E-12	1.570E-16	-1.000E+00	0.000E+00	0.000E+00
BREAST	8.410E-15	2.527E-12	3.560E-12	1.530E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	7.040E-15	2.379E-12	3.351E-12	1.440E-16	-1.000E+00	0.000E+00	0.000E+00
RED MARR	6.430E-15	2.346E-12	3.304E-12	1.420E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	1.880E-14	5.286E-12	7.446E-12	3.200E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	7.330E-15	2.395E-12	3.374E-12	1.450E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	6.640E-15	2.313E-12	3.257E-12	1.400E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	7.480E-15	2.511E-12	3.537E-12	1.520E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	2.240E-14	2.247E-11	3.164E-11	1.360E-15	-1.000E+00	0.000E+00	0.000E+00
Kr-85m							
GONADS	7.310E-15	2.594E-12	3.653E-12	1.570E-16	-1.000E+00	0.000E+00	0.000E+00
BREAST	8.410E-15	2.527E-12	3.560E-12	1.530E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	7.040E-15	2.379E-12	3.351E-12	1.440E-16	-1.000E+00	0.000E+00	0.000E+00
RED MARR	6.430E-15	2.346E-12	3.304E-12	1.420E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	1.880E-14	5.286E-12	7.446E-12	3.200E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	7.330E-15	2.395E-12	3.374E-12	1.450E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	6.640E-15	2.313E-12	3.257E-12	1.400E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	7.480E-15	2.511E-12	3.537E-12	1.520E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	2.240E-14	2.247E-11	3.164E-11	1.360E-15	-1.000E+00	0.000E+00	0.000E+00
Kr-85							
GONADS	1.170E-16	8.121E-14	1.704E-12	2.820E-18	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.340E-16	7.891E-14	1.656E-12	2.740E-18	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.140E-16	7.056E-14	1.481E-12	2.450E-18	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.090E-16	6.998E-14	1.469E-12	2.430E-18	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	2.200E-16	1.287E-13	2.702E-12	4.470E-18	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.180E-16	7.459E-14	1.565E-12	2.590E-18	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.090E-16	6.941E-14	1.457E-12	2.410E-18	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.190E-16	7.603E-14	1.596E-12	2.640E-18	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	1.320E-14	2.304E-11	4.835E-10	8.000E-16	-1.000E+00	0.000E+00	0.000E+00
Kr-87							
GONADS	4.000E-14	4.962E-12	5.026E-12	7.610E-16	-1.000E+00	0.000E+00	0.000E+00

BREAST	4.500E-14	4.740E-12	4.802E-12	7.270E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	4.040E-14	4.603E-12	4.663E-12	7.060E-16	-1.000E+00	0.000E+00	0.000E+00
RED MARR	4.000E-14	4.708E-12	4.769E-12	7.220E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	6.020E-14	6.514E-12	6.598E-12	9.990E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	4.130E-14	4.473E-12	4.531E-12	6.860E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	3.910E-14	4.590E-12	4.650E-12	7.040E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	4.120E-14	4.773E-12	4.835E-12	7.320E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	1.370E-13	8.802E-11	8.916E-11	1.350E-14	-1.000E+00	0.000E+00	0.000E+00
Kr-88							
GONADS	9.900E-14	2.278E-11	2.655E-11	1.800E-15	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.110E-13	2.177E-11	2.537E-11	1.720E-15	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.010E-13	2.139E-11	2.493E-11	1.690E-15	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.000E-13	2.190E-11	2.552E-11	1.730E-15	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	1.390E-13	2.886E-11	3.363E-11	2.280E-15	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.030E-13	2.012E-11	2.345E-11	1.590E-15	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	9.790E-14	2.139E-11	2.493E-11	1.690E-15	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.020E-13	2.202E-11	2.567E-11	1.740E-15	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	1.350E-13	5.607E-11	6.534E-11	4.430E-15	-1.000E+00	0.000E+00	0.000E+00
Kr-89							
GONADS	9.900E-14	2.278E-11	2.655E-11	1.800E-15	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.110E-13	2.177E-11	2.537E-11	1.720E-15	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.010E-13	2.139E-11	2.493E-11	1.690E-15	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.000E-13	2.190E-11	2.552E-11	1.730E-15	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	1.390E-13	2.886E-11	3.363E-11	2.280E-15	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.030E-13	2.012E-11	2.345E-11	1.590E-15	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	9.790E-14	2.139E-11	2.493E-11	1.690E-15	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.020E-13	2.202E-11	2.567E-11	1.740E-15	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	1.350E-13	5.607E-11	6.534E-11	4.430E-15	-1.000E+00	0.000E+00	0.000E+00
Rb-86							
GONADS	4.710E-15	2.788E-12	5.187E-11	9.740E-17	-1.000E+00	1.340E-09	2.150E-09
BREAST	5.340E-15	2.662E-12	4.953E-11	9.300E-17	-1.000E+00	1.330E-09	2.140E-09
LUNGS	4.710E-15	2.553E-12	4.750E-11	8.920E-17	-1.000E+00	3.300E-09	2.140E-09
RED MARR	4.640E-15	2.619E-12	4.873E-11	9.150E-17	-1.000E+00	2.320E-09	3.720E-09
BONE SUR	7.050E-15	3.635E-12	6.764E-11	1.270E-16	-1.000E+00	4.270E-09	6.860E-09
THYROID	4.840E-15	2.599E-12	4.836E-11	9.080E-17	-1.000E+00	1.330E-09	2.140E-09
REMAINDER	4.520E-15	2.542E-12	4.729E-11	8.880E-17	-1.000E+00	1.380E-09	2.330E-09
EFFECTIVE	4.810E-15	2.665E-12	4.958E-11	9.310E-17	-1.000E+00	1.790E-09	2.530E-09
SKIN (FGR)	4.850E-14	2.210E-10	4.111E-09	7.720E-15	-1.000E+00	0.000E+00	0.000E+00
Sr-89							
GONADS	7.730E-17	7.155E-14	1.436E-12	2.490E-18	-1.000E+00	7.950E-12	8.050E-12
BREAST	9.080E-17	7.212E-14	1.447E-12	2.510E-18	-1.000E+00	7.960E-12	7.980E-12
LUNGS	7.080E-17	5.689E-14	1.142E-12	1.980E-18	-1.000E+00	8.350E-08	7.970E-12
RED MARR	6.390E-17	5.345E-14	1.073E-12	1.860E-18	-1.000E+00	1.070E-10	1.080E-10
BONE SUR	1.940E-16	1.560E-13	3.131E-12	5.430E-18	-1.000E+00	1.590E-10	1.610E-10
THYROID	7.600E-17	6.063E-14	1.217E-12	2.110E-18	-1.000E+00	7.960E-12	7.970E-12
REMAINDER	6.710E-17	5.603E-14	1.124E-12	1.950E-18	-1.000E+00	3.970E-09	8.250E-09
EFFECTIVE	7.730E-17	6.523E-14	1.309E-12	2.270E-18	-1.000E+00	1.120E-08	2.500E-09
SKIN (FGR)	3.690E-14	1.914E-10	3.841E-09	6.660E-15	-1.000E+00	0.000E+00	0.000E+00
Sr-90							
GONADS	7.780E-18	9.590E-15	2.014E-13	3.330E-19	-1.000E+00	2.690E-10	5.040E-11
BREAST	9.490E-18	1.008E-14	2.116E-13	3.500E-19	-1.000E+00	2.690E-10	5.040E-11
LUNGS	6.440E-18	6.307E-15	1.324E-13	2.190E-19	-1.000E+00	2.860E-06	5.040E-11
RED MARR	5.440E-18	5.558E-15	1.167E-13	1.930E-19	-1.000E+00	3.280E-08	6.450E-09
BONE SUR	2.280E-17	2.393E-14	5.025E-13	8.310E-19	-1.000E+00	7.090E-08	1.390E-08
THYROID	7.330E-18	7.171E-15	1.506E-13	2.490E-19	-1.000E+00	2.690E-10	5.040E-11
REMAINDER	6.110E-18	6.422E-15	1.348E-13	2.230E-19	-1.000E+00	5.730E-09	6.700E-09

EFFECTIVE	7.530E-18	8.179E-15	1.717E-13	2.840E-19	-1.000E+00	3.510E-07	3.230E-09
SKIN (FGR)	9.200E-15	4.032E-12	8.465E-11	1.400E-16	-1.000E+00	0.000E+00	0.000E+00
Sr-91							
GONADS	4.819E-14	2.155E-11	5.062E-11	1.026E-15	-1.000E+00	5.669E-11	2.520E-10
BREAST	5.477E-14	2.059E-11	4.838E-11	9.806E-16	-1.000E+00	1.775E-11	3.676E-11
LUNGS	4.803E-14	1.970E-11	4.626E-11	9.376E-16	-1.000E+00	2.170E-09	1.055E-11
RED MARR	4.691E-14	2.011E-11	4.722E-11	9.570E-16	-1.000E+00	2.275E-11	5.659E-11
BONE SUR	7.674E-14	2.852E-11	6.709E-11	1.360E-15	-1.000E+00	1.306E-11	2.070E-11
THYROID	4.938E-14	2.035E-11	4.782E-11	9.693E-16	-1.000E+00	9.930E-12	1.968E-12
REMAINDER	4.610E-14	1.948E-11	4.573E-11	9.268E-16	-1.000E+00	5.802E-10	2.557E-09
EFFECTIVE	4.924E-14	2.057E-11	4.832E-11	9.793E-16	-1.000E+00	4.547E-10	8.455E-10
SKIN (FGR)	9.938E-14	1.748E-10	3.987E-10	8.080E-15	-1.000E+00	0.000E+00	0.000E+00
Sr-92							
GONADS	6.610E-14	1.593E-11	1.830E-11	1.300E-15	-1.000E+00	1.020E-11	8.180E-11
BREAST	7.480E-14	1.520E-11	1.745E-11	1.240E-15	-1.000E+00	6.490E-12	1.700E-11
LUNGS	6.670E-14	1.483E-11	1.703E-11	1.210E-15	-1.000E+00	1.050E-09	7.220E-12
RED MARR	6.620E-14	1.520E-11	1.745E-11	1.240E-15	-1.000E+00	6.980E-12	2.290E-11
BONE SUR	9.490E-14	2.010E-11	2.308E-11	1.640E-15	-1.000E+00	4.360E-12	8.490E-12
THYROID	6.820E-14	1.446E-11	1.661E-11	1.180E-15	-1.000E+00	3.920E-12	1.300E-12
REMAINDER	6.450E-14	1.471E-11	1.689E-11	1.200E-15	-1.000E+00	2.900E-10	1.720E-09
EFFECTIVE	6.790E-14	1.532E-11	1.759E-11	1.250E-15	-1.000E+00	2.180E-10	5.430E-10
SKIN (FGR)	8.560E-14	2.280E-11	2.618E-11	1.860E-15	-1.000E+00	0.000E+00	0.000E+00
Y-90							
GONADS	1.890E-16	1.586E-13	1.601E-12	5.750E-18	-1.000E+00	5.170E-13	1.430E-14
BREAST	2.200E-16	1.578E-13	1.593E-12	5.720E-18	-1.000E+00	5.170E-13	1.270E-14
LUNGS	1.770E-16	1.313E-13	1.326E-12	4.760E-18	-1.000E+00	9.310E-09	1.260E-14
RED MARR	1.620E-16	1.261E-13	1.273E-12	4.570E-18	-1.000E+00	1.520E-11	3.700E-13
BONE SUR	4.440E-16	3.228E-13	3.259E-12	1.170E-17	-1.000E+00	1.510E-11	3.670E-13
THYROID	1.870E-16	1.385E-13	1.398E-12	5.020E-18	-1.000E+00	5.170E-13	1.260E-14
REMAINDER	1.680E-16	1.291E-13	1.303E-12	4.680E-18	-1.000E+00	3.870E-09	9.680E-09
EFFECTIVE	1.900E-16	1.468E-13	1.482E-12	5.320E-18	-1.000E+00	2.280E-09	2.910E-09
SKIN (FGR)	6.240E-14	2.897E-10	2.924E-09	1.050E-14	-1.000E+00	0.000E+00	0.000E+00
Y-91							
GONADS	2.560E-16	1.756E-13	3.546E-12	6.110E-18	-1.000E+00	8.200E-12	3.540E-12
BREAST	2.930E-16	1.713E-13	3.459E-12	5.960E-18	-1.000E+00	8.920E-12	5.540E-13
LUNGS	2.500E-16	1.526E-13	3.082E-12	5.310E-18	-1.000E+00	9.870E-08	2.020E-13
RED MARR	2.410E-16	1.521E-13	3.070E-12	5.290E-18	-1.000E+00	3.190E-10	6.590E-12
BONE SUR	4.560E-16	2.903E-13	5.862E-12	1.010E-17	-1.000E+00	3.180E-10	6.130E-12
THYROID	2.600E-16	1.564E-13	3.157E-12	5.440E-18	-1.000E+00	8.500E-12	1.290E-13
REMAINDER	2.390E-16	1.509E-13	3.047E-12	5.250E-18	-1.000E+00	4.200E-09	8.570E-09
EFFECTIVE	2.600E-16	1.650E-13	3.332E-12	5.740E-18	-1.000E+00	1.320E-08	2.570E-09
SKIN (FGR)	3.850E-14	1.989E-10	4.016E-09	6.920E-15	-1.000E+00	0.000E+00	0.000E+00
Y-92							
GONADS	1.270E-14	3.855E-12	4.872E-12	2.650E-16	-1.000E+00	2.610E-12	1.960E-11
BREAST	1.440E-14	3.680E-12	4.652E-12	2.530E-16	-1.000E+00	1.500E-12	3.550E-12
LUNGS	1.270E-14	3.535E-12	4.468E-12	2.430E-16	-1.000E+00	1.240E-09	1.390E-12
RED MARR	1.250E-14	3.608E-12	4.560E-12	2.480E-16	-1.000E+00	2.070E-12	4.910E-12
BONE SUR	1.950E-14	5.091E-12	6.435E-12	3.500E-16	-1.000E+00	1.510E-12	1.750E-12
THYROID	1.300E-14	3.579E-12	4.523E-12	2.460E-16	-1.000E+00	1.050E-12	1.770E-13
REMAINDER	1.220E-14	3.506E-12	4.431E-12	2.410E-16	-1.000E+00	2.030E-10	1.700E-09
EFFECTIVE	1.300E-14	3.680E-12	4.652E-12	2.530E-16	-1.000E+00	2.110E-10	5.150E-10
SKIN (FGR)	1.140E-13	2.022E-10	2.556E-10	1.390E-14	-1.000E+00	0.000E+00	0.000E+00
Y-93							
GONADS	4.670E-15	2.108E-12	4.989E-12	9.510E-17	-1.000E+00	5.310E-12	2.200E-11
BREAST	5.300E-15	2.026E-12	4.794E-12	9.140E-17	-1.000E+00	1.740E-12	3.130E-12
LUNGS	4.680E-15	1.937E-12	4.585E-12	8.740E-17	-1.000E+00	2.520E-09	8.670E-13

RED MARR	4.580E-15	1.972E-12	4.669E-12	8.900E-17	-1.000E+00	4.040E-12	4.930E-12
BONE SUR	7.580E-15	2.948E-12	6.977E-12	1.330E-16	-1.000E+00	3.140E-12	1.730E-12
THYROID	4.790E-15	1.908E-12	4.516E-12	8.610E-17	-1.000E+00	9.260E-13	1.260E-13
REMAINDER	4.510E-15	1.919E-12	4.543E-12	8.660E-17	-1.000E+00	9.250E-10	4.090E-09
EFFECTIVE	4.800E-15	2.021E-12	4.784E-12	9.120E-17	-1.000E+00	5.820E-10	1.230E-09
SKIN (FGR)	8.500E-14	2.726E-10	6.452E-10	1.230E-14	-1.000E+00	0.000E+00	0.000E+00
Zr-95							
GONADS	3.530E-14	2.182E-11	4.421E-10	7.590E-16	-1.000E+00	1.880E-09	8.160E-10
BREAST	4.010E-14	2.084E-11	4.223E-10	7.250E-16	-1.000E+00	1.910E-09	1.050E-10
LUNGS	3.510E-14	1.989E-11	4.030E-10	6.920E-16	-1.000E+00	2.170E-09	2.340E-11
RED MARR	3.430E-14	2.030E-11	4.112E-10	7.060E-16	-1.000E+00	1.300E-08	2.140E-10
BONE SUR	5.620E-14	2.875E-11	5.824E-10	1.000E-15	-1.000E+00	1.030E-07	4.860E-10
THYROID	3.610E-14	2.076E-11	4.205E-10	7.220E-16	-1.000E+00	1.440E-09	8.270E-12
REMAINDER	3.360E-14	1.963E-11	3.978E-10	6.830E-16	-1.000E+00	2.280E-09	2.530E-09
EFFECTIVE	3.600E-14	2.078E-11	4.211E-10	7.230E-16	-1.000E+00	6.390E-09	1.020E-09
SKIN (FGR)	4.500E-14	2.561E-11	5.190E-10	8.910E-16	-1.000E+00	0.000E+00	0.000E+00
Zr-97							
GONADS	4.331E-14	2.179E-11	7.799E-11	9.253E-16	-1.000E+00	1.840E-10	6.228E-10
BREAST	4.928E-14	2.083E-11	7.455E-11	8.846E-16	-1.000E+00	4.706E-11	8.137E-11
LUNGS	4.322E-14	1.992E-11	7.127E-11	8.456E-16	-1.000E+00	4.108E-09	1.770E-11
RED MARR	4.224E-14	2.034E-11	7.279E-11	8.634E-16	-1.000E+00	6.376E-11	1.302E-10
BONE SUR	6.897E-14	2.881E-11	1.031E-10	1.224E-15	-1.000E+00	3.504E-11	4.558E-11
THYROID	4.443E-14	2.061E-11	7.377E-11	8.755E-16	-1.000E+00	2.315E-11	2.671E-12
REMAINDER	4.139E-14	1.966E-11	7.035E-11	8.345E-16	-1.000E+00	2.041E-09	6.990E-09
EFFECTIVE	4.432E-14	2.078E-11	7.438E-11	8.824E-16	-1.000E+00	1.171E-09	2.283E-09
SKIN (FGR)	9.835E-14	2.281E-10	8.148E-10	9.587E-15	-1.000E+00	0.000E+00	0.000E+00
Nb-95							
GONADS	3.660E-14	2.253E-11	4.435E-10	7.850E-16	-1.000E+00	4.320E-10	8.050E-10
BREAST	4.160E-14	2.150E-11	4.231E-10	7.490E-16	-1.000E+00	4.070E-10	1.070E-10
LUNGS	3.650E-14	2.055E-11	4.045E-10	7.160E-16	-1.000E+00	8.320E-09	2.740E-11
RED MARR	3.560E-14	2.101E-11	4.135E-10	7.320E-16	-1.000E+00	4.420E-10	1.990E-10
BONE SUR	5.790E-14	2.957E-11	5.819E-10	1.030E-15	-1.000E+00	5.130E-10	2.940E-10
THYROID	3.750E-14	2.144E-11	4.220E-10	7.470E-16	-1.000E+00	3.580E-10	1.180E-11
REMAINDER	3.490E-14	2.032E-11	4.000E-10	7.080E-16	-1.000E+00	1.070E-09	1.470E-09
EFFECTIVE	3.740E-14	2.147E-11	4.226E-10	7.480E-16	-1.000E+00	1.570E-09	6.950E-10
SKIN (FGR)	4.300E-14	2.598E-11	5.112E-10	9.050E-16	-1.000E+00	0.000E+00	0.000E+00
Mo-99							
GONADS	7.130E-15	4.282E-12	4.403E-11	1.550E-16	-1.000E+00	9.510E-11	2.180E-10
BREAST	8.130E-15	4.116E-12	4.233E-11	1.490E-16	-1.000E+00	2.750E-11	3.430E-11
LUNGS	7.060E-15	3.867E-12	3.977E-11	1.400E-16	-1.000E+00	4.290E-09	1.510E-11
RED MARR	6.820E-15	3.923E-12	4.034E-11	1.420E-16	-1.000E+00	5.240E-11	8.320E-11
BONE SUR	1.240E-14	6.105E-12	6.278E-11	2.210E-16	-1.000E+00	4.130E-11	6.320E-11
THYROID	7.270E-15	4.033E-12	4.147E-11	1.460E-16	-1.000E+00	1.520E-11	1.030E-11
REMAINDER	6.740E-15	3.812E-12	3.920E-11	1.380E-16	-1.000E+00	1.740E-09	4.280E-09
EFFECTIVE	7.280E-15	4.061E-12	4.176E-11	1.470E-16	-1.000E+00	1.070E-09	1.360E-09
SKIN (FGR)	3.140E-14	1.039E-10	1.068E-09	3.760E-15	-1.000E+00	0.000E+00	0.000E+00
Tc-99m							
GONADS	5.750E-15	2.334E-12	3.877E-12	1.240E-16	-1.000E+00	2.770E-12	9.750E-12
BREAST	6.650E-15	2.258E-12	3.752E-12	1.200E-16	-1.000E+00	2.150E-12	3.570E-12
LUNGS	5.490E-15	2.127E-12	3.533E-12	1.130E-16	-1.000E+00	2.280E-11	3.140E-12
RED MARR	4.910E-15	2.070E-12	3.439E-12	1.100E-16	-1.000E+00	3.360E-12	6.290E-12
BONE SUR	1.630E-14	5.383E-12	8.942E-12	2.860E-16	-1.000E+00	2.620E-12	4.060E-12
THYROID	5.750E-15	2.145E-12	3.564E-12	1.140E-16	-1.000E+00	5.010E-11	8.460E-11
REMAINDER	5.150E-15	2.070E-12	3.439E-12	1.100E-16	-1.000E+00	1.020E-11	3.340E-11
EFFECTIVE	5.890E-15	2.277E-12	3.783E-12	1.210E-16	-1.000E+00	8.800E-12	1.680E-11
SKIN (FGR)	7.140E-15	2.710E-12	4.502E-12	1.440E-16	-1.000E+00	0.000E+00	0.000E+00

## Ru-103

GONADS	2.191E-14	1.404E-11	2.783E-10	4.892E-16	-1.000E+00	3.070E-10	5.720E-10
BREAST	2.512E-14	1.350E-11	2.677E-10	4.705E-16	-1.000E+00	3.110E-10	1.200E-10
LUNGS	2.180E-14	1.273E-11	2.522E-10	4.432E-16	-1.000E+00	1.561E-08	7.310E-11
RED MARR	2.100E-14	1.287E-11	2.551E-10	4.483E-16	-1.000E+00	3.190E-10	1.660E-10
BONE SUR	3.892E-14	1.958E-11	3.882E-10	6.823E-16	-1.000E+00	2.370E-10	9.631E-11
THYROID	2.241E-14	1.331E-11	2.639E-10	4.638E-16	-1.000E+00	2.570E-10	6.250E-11
REMAINDER	2.080E-14	1.248E-11	2.472E-10	4.346E-16	-1.000E+00	1.250E-09	2.110E-09
EFFECTIVE	2.251E-14	1.332E-11	2.641E-10	4.642E-16	-1.000E+00	2.421E-09	8.271E-10
SKIN (FGR)	2.774E-14	1.785E-11	3.543E-10	6.229E-16	-1.000E+00	0.000E+00	0.000E+00

## Ru-105

GONADS	3.720E-14	1.327E-11	1.861E-11	8.070E-16	-1.000E+00	1.590E-11	9.670E-11
BREAST	4.240E-14	1.271E-11	1.783E-11	7.730E-16	-1.000E+00	6.610E-12	1.590E-11
LUNGS	3.700E-14	1.210E-11	1.697E-11	7.360E-16	-1.000E+00	5.730E-10	6.210E-12
RED MARR	3.590E-14	1.230E-11	1.725E-11	7.480E-16	-1.000E+00	7.700E-12	2.350E-11
BONE SUR	6.280E-14	1.809E-11	2.537E-11	1.100E-15	-1.000E+00	4.620E-12	8.890E-12
THYROID	3.800E-14	1.260E-11	1.766E-11	7.660E-16	-1.000E+00	4.150E-12	1.820E-12
REMAINDER	3.540E-14	1.189E-11	1.667E-11	7.230E-16	-1.000E+00	1.610E-10	8.540E-10
EFFECTIVE	3.810E-14	1.265E-11	1.773E-11	7.690E-16	-1.000E+00	1.230E-10	2.870E-10
SKIN (FGR)	6.730E-14	7.368E-11	1.033E-10	4.480E-15	-1.000E+00	0.000E+00	0.000E+00

## Ru-106

GONADS	1.010E-14	6.411E-12	1.340E-10	2.230E-16	-1.000E+00	1.300E-09	1.640E-09
BREAST	1.160E-14	6.152E-12	1.286E-10	2.140E-16	-1.000E+00	1.780E-09	1.440E-09
LUNGS	1.010E-14	5.836E-12	1.220E-10	2.030E-16	-1.000E+00	1.040E-06	1.420E-09
RED MARR	9.750E-15	5.893E-12	1.232E-10	2.050E-16	-1.000E+00	1.760E-09	1.460E-09
BONE SUR	1.720E-14	8.883E-12	1.856E-10	3.090E-16	-1.000E+00	1.610E-09	1.430E-09
THYROID	1.030E-14	6.066E-12	1.268E-10	2.110E-16	-1.000E+00	1.720E-09	1.410E-09
REMAINDER	9.630E-15	5.721E-12	1.196E-10	1.990E-16	-1.000E+00	1.200E-08	2.110E-08
EFFECTIVE	1.040E-14	6.095E-12	1.274E-10	2.120E-16	-1.000E+00	1.290E-07	7.400E-09
SKIN (FGR)	1.090E-13	4.082E-10	8.531E-09	1.420E-14	-1.000E+00	0.000E+00	0.000E+00

## Rh-105

GONADS	3.640E-15	2.127E-12	1.411E-11	7.980E-17	-1.000E+00	2.110E-11	5.800E-11
BREAST	4.160E-15	2.063E-12	1.369E-11	7.740E-17	-1.000E+00	5.610E-12	8.970E-12
LUNGS	3.570E-15	1.935E-12	1.284E-11	7.260E-17	-1.000E+00	9.580E-10	3.860E-12
RED MARR	3.380E-15	1.946E-12	1.291E-11	7.300E-17	-1.000E+00	7.770E-12	1.470E-11
BONE SUR	7.530E-15	3.332E-12	2.210E-11	1.250E-16	-1.000E+00	4.460E-12	6.750E-12
THYROID	3.680E-15	1.983E-12	1.316E-11	7.440E-17	-1.000E+00	2.880E-12	2.910E-12
REMAINDER	3.390E-15	1.885E-12	1.250E-11	7.070E-17	-1.000E+00	4.530E-10	1.270E-09
EFFECTIVE	3.720E-15	2.031E-12	1.347E-11	7.620E-17	-1.000E+00	2.580E-10	3.990E-10
SKIN (FGR)	1.070E-14	4.691E-12	3.112E-11	1.760E-16	-1.000E+00	0.000E+00	0.000E+00

## Sb-127

GONADS	3.260E-14	1.985E-11	2.441E-10	7.100E-16	-1.000E+00	2.520E-10	6.140E-10
BREAST	3.720E-14	1.904E-11	2.341E-10	6.810E-16	-1.000E+00	9.120E-11	7.600E-11
LUNGS	3.240E-14	1.809E-11	2.224E-10	6.470E-16	-1.000E+00	6.940E-09	1.570E-11
RED MARR	3.140E-14	1.834E-11	2.255E-10	6.560E-16	-1.000E+00	1.610E-10	1.330E-10
BONE SUR	5.520E-14	2.720E-11	3.345E-10	9.730E-16	-1.000E+00	1.340E-10	5.240E-11
THYROID	3.330E-14	1.884E-11	2.317E-10	6.740E-16	-1.000E+00	6.150E-11	4.640E-12
REMAINDER	3.090E-14	1.775E-11	2.183E-10	6.350E-16	-1.000E+00	2.330E-09	5.870E-09
EFFECTIVE	3.330E-14	1.890E-11	2.324E-10	6.760E-16	-1.000E+00	1.630E-09	1.950E-09
SKIN (FGR)	5.580E-14	7.967E-11	9.799E-10	2.850E-15	-1.000E+00	0.000E+00	0.000E+00

## Sb-129

GONADS	6.970E-14	2.336E-11	3.231E-11	1.440E-15	-1.000E+00	2.150E-11	1.510E-10
BREAST	7.910E-14	2.222E-11	3.074E-11	1.370E-15	-1.000E+00	1.280E-11	2.560E-11
LUNGS	6.980E-14	2.141E-11	2.962E-11	1.320E-15	-1.000E+00	8.980E-10	9.390E-12
RED MARR	6.860E-14	2.190E-11	3.029E-11	1.350E-15	-1.000E+00	1.700E-11	3.670E-11
BONE SUR	1.070E-13	3.033E-11	4.196E-11	1.870E-15	-1.000E+00	1.460E-11	1.340E-11

THYROID	7.160E-14	2.174E-11	3.007E-11	1.340E-15	-1.000E+00	9.720E-12	1.470E-12
REMAINDER	6.710E-14	2.125E-11	2.939E-11	1.310E-15	-1.000E+00	1.870E-10	1.450E-09
EFFECTIVE	7.140E-14	2.238E-11	3.096E-11	1.380E-15	-1.000E+00	1.740E-10	4.840E-10
SKIN (FGR)	1.050E-13	8.273E-11	1.144E-10	5.100E-15	-1.000E+00	0.000E+00	0.000E+00
Te-127							
GONADS	2.370E-16	1.191E-13	2.661E-13	5.480E-18	-1.000E+00	2.020E-12	4.020E-12
BREAST	2.730E-16	1.158E-13	2.588E-13	5.330E-18	-1.000E+00	1.880E-12	3.000E-12
LUNGS	2.320E-16	1.060E-13	2.370E-13	4.880E-18	-1.000E+00	4.270E-10	2.890E-12
RED MARR	2.210E-16	1.058E-13	2.365E-13	4.870E-18	-1.000E+00	4.090E-12	6.570E-12
BONE SUR	4.650E-16	1.862E-13	4.162E-13	8.570E-18	-1.000E+00	4.090E-12	6.460E-12
THYROID	2.400E-16	1.106E-13	2.472E-13	5.090E-18	-1.000E+00	1.840E-12	2.860E-12
REMAINDER	2.210E-16	1.036E-13	2.316E-13	4.770E-18	-1.000E+00	1.110E-10	6.130E-10
EFFECTIVE	2.420E-16	1.125E-13	2.515E-13	5.180E-18	-1.000E+00	8.600E-11	1.870E-10
SKIN (FGR)	1.140E-14	1.173E-11	2.622E-11	5.400E-16	-1.000E+00	0.000E+00	0.000E+00
Te-127m							
GONADS	1.900E-16	4.689E-13	9.642E-12	1.630E-17	-1.000E+00	1.100E-10	1.250E-10
BREAST	2.690E-16	5.150E-13	1.059E-11	1.790E-17	-1.000E+00	1.100E-10	9.740E-11
LUNGS	7.620E-17	1.602E-13	3.295E-12	5.570E-18	-1.000E+00	3.340E-08	9.620E-11
RED MARR	6.430E-17	1.249E-13	2.567E-12	4.340E-18	-1.000E+00	5.360E-09	5.430E-09
BONE SUR	3.940E-16	9.005E-13	1.852E-11	3.130E-17	-1.000E+00	2.040E-08	2.070E-08
THYROID	1.500E-16	2.779E-13	5.714E-12	9.660E-18	-1.000E+00	9.660E-11	9.430E-11
REMAINDER	8.640E-17	1.999E-13	4.111E-12	6.950E-18	-1.000E+00	1.660E-09	2.980E-09
EFFECTIVE	1.470E-16	3.251E-13	6.684E-12	1.130E-17	-1.000E+00	5.810E-09	2.230E-09
SKIN (FGR)	8.490E-16	1.496E-12	3.076E-11	5.200E-17	-1.000E+00	0.000E+00	0.000E+00
Te-129							
GONADS	2.710E-15	3.889E-13	3.922E-13	6.510E-17	-1.000E+00	5.050E-13	1.590E-12
BREAST	3.120E-15	3.800E-13	3.832E-13	6.360E-17	-1.000E+00	5.390E-13	6.050E-13
LUNGS	2.640E-15	3.298E-13	3.326E-13	5.520E-17	-1.000E+00	1.530E-10	4.910E-13
RED MARR	2.540E-15	3.298E-13	3.326E-13	5.520E-17	-1.000E+00	6.190E-13	7.640E-13
BONE SUR	4.880E-15	5.753E-13	5.802E-13	9.630E-17	-1.000E+00	6.220E-13	5.400E-13
THYROID	2.740E-15	3.525E-13	3.555E-13	5.900E-17	-1.000E+00	5.090E-13	3.360E-13
REMAINDER	2.520E-15	3.262E-13	3.289E-13	5.460E-17	-1.000E+00	7.280E-12	1.790E-10
EFFECTIVE	2.750E-15	3.590E-13	3.621E-13	6.010E-17	-1.000E+00	2.090E-11	5.450E-11
SKIN (FGR)	3.570E-14	3.429E-11	3.458E-11	5.740E-15	-1.000E+00	0.000E+00	0.000E+00
Te-129m							
GONADS	3.321E-15	2.206E-12	4.799E-11	8.561E-17	-1.000E+00	1.783E-10	2.420E-10
BREAST	3.838E-15	2.181E-12	4.739E-11	8.454E-17	-1.000E+00	1.694E-10	1.664E-10
LUNGS	3.176E-15	1.741E-12	3.815E-11	6.808E-17	-1.000E+00	4.040E-08	1.593E-10
RED MARR	3.071E-15	1.729E-12	3.793E-11	6.768E-17	-1.000E+00	3.100E-09	3.500E-09
BONE SUR	5.772E-15	3.287E-12	7.147E-11	1.275E-16	-1.000E+00	7.050E-09	7.990E-09
THYROID	3.341E-15	1.923E-12	4.201E-11	7.495E-17	-1.000E+00	1.563E-10	1.572E-10
REMAINDER	3.048E-15	1.746E-12	3.822E-11	6.819E-17	-1.000E+00	3.275E-09	7.196E-09
EFFECTIVE	3.337E-15	1.974E-12	4.308E-11	7.686E-17	-1.000E+00	6.484E-09	2.925E-09
SKIN (FGR)	3.811E-14	1.501E-10	3.360E-09	6.001E-15	-1.000E+00	0.000E+00	0.000E+00
Te-131m							
GONADS	7.292E-14	4.020E-11	2.343E-10	1.535E-15	-1.000E+00	2.345E-10	7.415E-10
BREAST	8.286E-14	3.853E-11	2.246E-10	1.472E-15	-1.000E+00	9.309E-11	1.361E-10
LUNGS	7.265E-14	3.657E-11	2.131E-10	1.397E-15	-1.000E+00	2.296E-09	6.335E-11
RED MARR	7.097E-14	3.736E-11	2.178E-10	1.427E-15	-1.000E+00	1.417E-10	2.435E-10
BONE SUR	1.174E-13	5.467E-11	3.189E-10	2.090E-15	-1.000E+00	2.276E-10	3.248E-10
THYROID	7.471E-14	3.741E-11	2.181E-10	1.429E-15	-1.000E+00	3.669E-08	4.383E-08
REMAINDER	6.965E-14	3.626E-11	2.113E-10	1.385E-15	-1.000E+00	9.509E-10	3.153E-09
EFFECTIVE	7.463E-14	3.825E-11	2.229E-10	1.461E-15	-1.000E+00	1.758E-09	2.514E-09
SKIN (FGR)	1.038E-13	1.033E-10	6.188E-10	4.056E-15	-1.000E+00	0.000E+00	0.000E+00
Te-132							
GONADS	1.020E-14	6.812E-12	7.706E-11	2.450E-16	-1.000E+00	4.150E-10	5.410E-10

BREAST	1.180E-14	6.756E-12	7.643E-11	2.430E-16	-1.000E+00	3.630E-10	3.500E-10
LUNGS	9.650E-15	5.727E-12	6.479E-11	2.060E-16	-1.000E+00	1.670E-09	3.300E-10
RED MARR	8.950E-15	5.588E-12	6.322E-11	2.010E-16	-1.000E+00	4.270E-10	4.440E-10
BONE SUR	2.420E-14	1.273E-11	1.441E-10	4.580E-16	-1.000E+00	7.120E-10	8.300E-10
THYROID	1.020E-14	5.978E-12	6.762E-11	2.150E-16	-1.000E+00	6.280E-08	5.950E-08
REMAINDER	9.160E-15	5.644E-12	6.385E-11	2.030E-16	-1.000E+00	7.890E-10	1.490E-09
EFFECTIVE	1.030E-14	6.339E-12	7.171E-11	2.280E-16	-1.000E+00	2.550E-09	2.540E-09
SKIN (FGR)	1.390E-14	8.313E-12	9.405E-11	2.990E-16	-1.000E+00	0.000E+00	0.000E+00
I-131							
GONADS	1.780E-14	1.119E-11	1.789E-10	3.940E-16	-1.000E+00	2.530E-11	4.070E-11
BREAST	2.040E-14	1.082E-11	1.730E-10	3.810E-16	-1.000E+00	7.880E-11	1.210E-10
LUNGS	1.760E-14	1.016E-11	1.626E-10	3.580E-16	-1.000E+00	6.570E-10	1.020E-10
RED MARR	1.680E-14	1.022E-11	1.635E-10	3.600E-16	-1.000E+00	6.260E-11	9.440E-11
BONE SUR	3.450E-14	1.675E-11	2.679E-10	5.900E-16	-1.000E+00	5.730E-11	8.720E-11
THYROID	1.810E-14	1.053E-11	1.685E-10	3.710E-16	-1.000E+00	2.920E-07	4.760E-07
REMAINDER	1.670E-14	9.908E-12	1.585E-10	3.490E-16	-1.000E+00	8.030E-11	1.570E-10
EFFECTIVE	1.820E-14	1.067E-11	1.707E-10	3.760E-16	-1.000E+00	8.890E-09	1.440E-08
SKIN (FGR)	2.980E-14	1.825E-11	2.920E-10	6.430E-16	-1.000E+00	0.000E+00	0.000E+00
I-132							
GONADS	1.090E-13	2.523E-11	2.771E-11	2.320E-15	-1.000E+00	9.950E-12	2.330E-11
BREAST	1.240E-13	2.414E-11	2.652E-11	2.220E-15	-1.000E+00	1.410E-11	2.520E-11
LUNGS	1.090E-13	2.305E-11	2.532E-11	2.120E-15	-1.000E+00	2.710E-10	2.640E-11
RED MARR	1.070E-13	2.360E-11	2.592E-11	2.170E-15	-1.000E+00	1.400E-11	2.460E-11
BONE SUR	1.730E-13	3.327E-11	3.655E-11	3.060E-15	-1.000E+00	1.240E-11	2.190E-11
THYROID	1.120E-13	2.381E-11	2.616E-11	2.190E-15	-1.000E+00	1.740E-09	3.870E-09
REMAINDER	1.050E-13	2.283E-11	2.509E-11	2.100E-15	-1.000E+00	3.780E-11	1.650E-10
EFFECTIVE	1.120E-13	2.403E-11	2.640E-11	2.210E-15	-1.000E+00	1.030E-10	1.820E-10
SKIN (FGR)	1.580E-13	8.199E-11	9.007E-11	7.540E-15	-1.000E+00	0.000E+00	0.000E+00
I-133							
GONADS	2.870E-14	1.585E-11	6.748E-11	6.270E-16	-1.000E+00	1.950E-11	3.630E-11
BREAST	3.280E-14	1.519E-11	6.468E-11	6.010E-16	-1.000E+00	2.940E-11	4.680E-11
LUNGS	2.860E-14	1.446E-11	6.156E-11	5.720E-16	-1.000E+00	8.200E-10	4.530E-11
RED MARR	2.770E-14	1.466E-11	6.242E-11	5.800E-16	-1.000E+00	2.720E-11	4.300E-11
BONE SUR	4.870E-14	2.161E-11	9.202E-11	8.550E-16	-1.000E+00	2.520E-11	4.070E-11
THYROID	2.930E-14	1.502E-11	6.393E-11	5.940E-16	-1.000E+00	4.860E-08	9.100E-08
REMAINDER	2.730E-14	1.418E-11	6.038E-11	5.610E-16	-1.000E+00	5.000E-11	1.550E-10
EFFECTIVE	2.940E-14	1.509E-11	6.425E-11	5.970E-16	-1.000E+00	1.580E-09	2.800E-09
SKIN (FGR)	5.830E-14	1.150E-10	4.897E-10	4.550E-15	-1.000E+00	0.000E+00	0.000E+00
I-134							
GONADS	1.270E-13	1.200E-11	1.202E-11	2.640E-15	-1.000E+00	4.250E-12	1.100E-11
BREAST	1.440E-13	1.145E-11	1.147E-11	2.520E-15	-1.000E+00	6.170E-12	1.170E-11
LUNGS	1.270E-13	1.100E-11	1.102E-11	2.420E-15	-1.000E+00	1.430E-10	1.260E-11
RED MARR	1.250E-13	1.127E-11	1.129E-11	2.480E-15	-1.000E+00	6.080E-12	1.090E-11
BONE SUR	1.960E-13	1.568E-11	1.571E-11	3.450E-15	-1.000E+00	5.310E-12	9.320E-12
THYROID	1.300E-13	1.127E-11	1.129E-11	2.480E-15	-1.000E+00	2.880E-10	6.210E-10
REMAINDER	1.220E-13	1.091E-11	1.093E-11	2.400E-15	-1.000E+00	2.270E-11	1.340E-10
EFFECTIVE	1.300E-13	1.150E-11	1.152E-11	2.530E-15	-1.000E+00	3.550E-11	6.660E-11
SKIN (FGR)	1.870E-13	4.477E-11	4.485E-11	9.850E-15	-1.000E+00	0.000E+00	0.000E+00
I-135							
GONADS	8.078E-14	3.113E-11	5.489E-11	1.599E-15	-1.000E+00	1.700E-11	3.610E-11
BREAST	9.143E-14	2.971E-11	5.240E-11	1.526E-15	-1.000E+00	2.340E-11	3.850E-11
LUNGS	8.145E-14	2.886E-11	5.089E-11	1.482E-15	-1.000E+00	4.410E-10	3.750E-11
RED MARR	8.054E-14	2.965E-11	5.228E-11	1.523E-15	-1.000E+00	2.240E-11	3.650E-11
BONE SUR	1.184E-13	3.983E-11	7.024E-11	2.046E-15	-1.000E+00	2.010E-11	3.360E-11
THYROID	8.324E-14	2.852E-11	5.030E-11	1.465E-15	-1.000E+00	8.460E-09	1.790E-08
REMAINDER	7.861E-14	2.883E-11	5.084E-11	1.481E-15	-1.000E+00	4.700E-11	1.540E-10

EFFECTIVE	8.294E-14	2.989E-11	5.271E-11	1.535E-15	-1.000E+00	3.320E-10	6.080E-10
SKIN (FGR)	1.156E-13	9.826E-11	1.733E-10	5.047E-15	-1.000E+00	0.000E+00	0.000E+00
Xe-133							
GONADS	1.610E-15	1.465E-12	2.052E-11	5.200E-17	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.960E-15	1.505E-12	2.107E-11	5.340E-17	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.320E-15	1.045E-12	1.464E-11	3.710E-17	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.070E-15	8.791E-13	1.231E-11	3.120E-17	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	5.130E-15	4.254E-12	5.958E-11	1.510E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.510E-15	1.181E-12	1.653E-11	4.190E-17	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.240E-15	1.042E-12	1.460E-11	3.700E-17	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.560E-15	1.299E-12	1.819E-11	4.610E-17	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	4.970E-15	1.953E-12	2.734E-11	6.930E-17	-1.000E+00	0.000E+00	0.000E+00
Xe-133m							
GONADS	1.610E-15	1.465E-12	2.052E-11	5.200E-17	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.960E-15	1.505E-12	2.107E-11	5.340E-17	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.320E-15	1.045E-12	1.464E-11	3.710E-17	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.070E-15	8.791E-13	1.231E-11	3.120E-17	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	5.130E-15	4.254E-12	5.958E-11	1.510E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.510E-15	1.181E-12	1.653E-11	4.190E-17	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.240E-15	1.042E-12	1.460E-11	3.700E-17	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.560E-15	1.299E-12	1.819E-11	4.610E-17	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	4.970E-15	1.953E-12	2.734E-11	6.930E-17	-1.000E+00	0.000E+00	0.000E+00
Xe-135							
GONADS	1.170E-14	5.455E-12	1.194E-11	2.530E-16	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.330E-14	5.325E-12	1.166E-11	2.470E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.130E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.070E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	2.570E-14	9.120E-12	1.997E-11	4.230E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.180E-14	5.023E-12	1.100E-11	2.330E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.080E-14	4.829E-12	1.058E-11	2.240E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.190E-14	5.217E-12	1.142E-11	2.420E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	3.120E-14	4.506E-11	9.867E-11	2.090E-15	-1.000E+00	0.000E+00	0.000E+00
Xe-135m							
GONADS	1.170E-14	5.455E-12	1.194E-11	2.530E-16	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.330E-14	5.325E-12	1.166E-11	2.470E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.130E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.070E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	2.570E-14	9.120E-12	1.997E-11	4.230E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.180E-14	5.023E-12	1.100E-11	2.330E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.080E-14	4.829E-12	1.058E-11	2.240E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.190E-14	5.217E-12	1.142E-11	2.420E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	3.120E-14	4.506E-11	9.867E-11	2.090E-15	-1.000E+00	0.000E+00	0.000E+00
Xe-137							
GONADS	1.170E-14	5.455E-12	1.194E-11	2.530E-16	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.330E-14	5.325E-12	1.166E-11	2.470E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.130E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	0.000E+00	0.000E+00
RED MARR	1.070E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	2.570E-14	9.120E-12	1.997E-11	4.230E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.180E-14	5.023E-12	1.100E-11	2.330E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.080E-14	4.829E-12	1.058E-11	2.240E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.190E-14	5.217E-12	1.142E-11	2.420E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	3.120E-14	4.506E-11	9.867E-11	2.090E-15	-1.000E+00	0.000E+00	0.000E+00
Xe-138							
GONADS	1.170E-14	5.455E-12	1.194E-11	2.530E-16	-1.000E+00	0.000E+00	0.000E+00
BREAST	1.330E-14	5.325E-12	1.166E-11	2.470E-16	-1.000E+00	0.000E+00	0.000E+00
LUNGS	1.130E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	0.000E+00	0.000E+00

RED MARR	1.070E-14	4.959E-12	1.086E-11	2.300E-16	-1.000E+00	0.000E+00	0.000E+00
BONE SUR	2.570E-14	9.120E-12	1.997E-11	4.230E-16	-1.000E+00	0.000E+00	0.000E+00
THYROID	1.180E-14	5.023E-12	1.100E-11	2.330E-16	-1.000E+00	0.000E+00	0.000E+00
REMAINDER	1.080E-14	4.829E-12	1.058E-11	2.240E-16	-1.000E+00	0.000E+00	0.000E+00
EFFECTIVE	1.190E-14	5.217E-12	1.142E-11	2.420E-16	-1.000E+00	0.000E+00	0.000E+00
SKIN (FGR)	3.120E-14	4.506E-11	9.867E-11	2.090E-15	-1.000E+00	0.000E+00	0.000E+00
Cs-134							
GONADS	7.400E-14	4.607E-11	9.646E-10	1.600E-15	-1.000E+00	1.300E-08	2.060E-08
BREAST	8.430E-14	4.406E-11	9.224E-10	1.530E-15	-1.000E+00	1.080E-08	1.720E-08
LUNGS	7.370E-14	4.204E-11	8.802E-10	1.460E-15	-1.000E+00	1.180E-08	1.760E-08
RED MARR	7.190E-14	4.262E-11	8.922E-10	1.480E-15	-1.000E+00	1.180E-08	1.870E-08
BONE SUR	1.200E-13	6.105E-11	1.278E-09	2.120E-15	-1.000E+00	1.100E-08	1.740E-08
THYROID	7.570E-14	4.377E-11	9.163E-10	1.520E-15	-1.000E+00	1.110E-08	1.760E-08
REMAINDER	7.060E-14	4.147E-11	8.681E-10	1.440E-15	-1.000E+00	1.390E-08	2.210E-08
EFFECTIVE	7.570E-14	4.377E-11	9.163E-10	1.520E-15	-1.000E+00	1.250E-08	1.980E-08
SKIN (FGR)	9.450E-14	6.249E-11	1.308E-09	2.170E-15	-1.000E+00	0.000E+00	0.000E+00
Cs-136							
GONADS	1.040E-13	6.223E-11	1.102E-09	2.180E-15	-1.000E+00	1.880E-09	3.040E-09
BREAST	1.180E-13	5.966E-11	1.056E-09	2.090E-15	-1.000E+00	1.670E-09	2.650E-09
LUNGS	1.040E-13	5.710E-11	1.011E-09	2.000E-15	-1.000E+00	2.320E-09	2.620E-09
RED MARR	1.010E-13	5.824E-11	1.031E-09	2.040E-15	-1.000E+00	1.860E-09	2.950E-09
BONE SUR	1.660E-13	8.422E-11	1.491E-09	2.950E-15	-1.000E+00	1.700E-09	2.710E-09
THYROID	1.070E-13	5.852E-11	1.036E-09	2.050E-15	-1.000E+00	1.730E-09	2.740E-09
REMAINDER	9.950E-14	5.652E-11	1.001E-09	1.980E-15	-1.000E+00	2.190E-09	3.520E-09
EFFECTIVE	1.060E-13	5.966E-11	1.056E-09	2.090E-15	-1.000E+00	1.980E-09	3.040E-09
SKIN (FGR)	1.250E-13	7.251E-11	1.284E-09	2.540E-15	-1.000E+00	0.000E+00	0.000E+00
Cs-137							
GONADS	2.669E-14	1.669E-11	3.530E-10	5.840E-16	-1.000E+00	8.760E-09	1.390E-08
BREAST	3.047E-14	1.596E-11	3.376E-10	5.585E-16	-1.000E+00	7.840E-09	1.240E-08
LUNGS	2.649E-14	1.517E-11	3.209E-10	5.309E-16	-1.000E+00	8.820E-09	1.270E-08
RED MARR	2.583E-14	1.542E-11	3.260E-10	5.394E-16	-1.000E+00	8.300E-09	1.320E-08
BONE SUR	4.382E-14	2.238E-11	4.734E-10	7.832E-16	-1.000E+00	7.940E-09	1.260E-08
THYROID	2.725E-14	1.588E-11	3.358E-10	5.556E-16	-1.000E+00	7.930E-09	1.260E-08
REMAINDER	2.536E-14	1.490E-11	3.152E-10	5.215E-16	-1.000E+00	9.120E-09	1.450E-08
EFFECTIVE	2.725E-14	1.585E-11	3.353E-10	5.546E-16	-1.000E+00	8.630E-09	1.350E-08
SKIN (FGR)	4.392E-14	5.253E-11	1.110E-09	1.836E-15	-1.000E+00	0.000E+00	0.000E+00
Ba-137m							
GONADS	2.669E-14	1.669E-11	3.530E-10	5.840E-16	-1.000E+00	8.760E-09	1.390E-08
BREAST	3.047E-14	1.596E-11	3.376E-10	5.585E-16	-1.000E+00	7.840E-09	1.240E-08
LUNGS	2.649E-14	1.517E-11	3.209E-10	5.309E-16	-1.000E+00	8.820E-09	1.270E-08
RED MARR	2.583E-14	1.542E-11	3.260E-10	5.394E-16	-1.000E+00	8.300E-09	1.320E-08
BONE SUR	4.382E-14	2.238E-11	4.734E-10	7.832E-16	-1.000E+00	7.940E-09	1.260E-08
THYROID	2.725E-14	1.588E-11	3.358E-10	5.556E-16	-1.000E+00	7.930E-09	1.260E-08
REMAINDER	2.536E-14	1.490E-11	3.152E-10	5.215E-16	-1.000E+00	9.120E-09	1.450E-08
EFFECTIVE	2.725E-14	1.585E-11	3.353E-10	5.546E-16	-1.000E+00	8.630E-09	1.350E-08
SKIN (FGR)	4.392E-14	5.253E-11	1.110E-09	1.836E-15	-1.000E+00	0.000E+00	0.000E+00
Ba-139							
GONADS	2.130E-15	3.368E-13	3.429E-13	4.790E-17	-1.000E+00	2.560E-12	1.560E-12
BREAST	2.450E-15	3.297E-13	3.357E-13	4.690E-17	-1.000E+00	2.460E-12	5.170E-13
LUNGS	2.030E-15	3.002E-13	3.057E-13	4.270E-17	-1.000E+00	2.530E-10	3.890E-13
RED MARR	1.870E-15	2.932E-13	2.985E-13	4.170E-17	-1.000E+00	3.410E-12	8.590E-13
BONE SUR	5.290E-15	6.841E-13	6.965E-13	9.730E-17	-1.000E+00	2.490E-12	4.380E-13
THYROID	2.130E-15	3.044E-13	3.100E-13	4.330E-17	-1.000E+00	2.400E-12	2.660E-13
REMAINDER	1.920E-15	2.932E-13	2.985E-13	4.170E-17	-1.000E+00	4.820E-11	3.570E-10
EFFECTIVE	2.170E-15	3.227E-13	3.286E-13	4.590E-17	-1.000E+00	4.640E-11	1.080E-10
SKIN (FGR)	6.160E-14	7.241E-11	7.373E-11	1.030E-14	-1.000E+00	0.000E+00	0.000E+00

## Ba-140

GONADS	8.410E-15	5.451E-12	9.607E-11	1.910E-16-1.000E+00	4.300E-10	9.960E-10
BREAST	9.640E-15	5.280E-12	9.305E-11	1.850E-16-1.000E+00	2.870E-10	1.590E-10
LUNGS	8.270E-15	4.852E-12	8.550E-11	1.700E-16-1.000E+00	1.660E-09	6.630E-11
RED MARR	7.930E-15	4.880E-12	8.601E-11	1.710E-16-1.000E+00	1.290E-09	4.390E-10
BONE SUR	1.550E-14	8.020E-12	1.413E-10	2.810E-16-1.000E+00	2.410E-09	5.530E-10
THYROID	8.530E-15	5.109E-12	9.003E-11	1.790E-16-1.000E+00	2.560E-10	5.250E-11
REMAINDER	7.890E-15	4.766E-12	8.399E-11	1.670E-16-1.000E+00	1.410E-09	7.370E-09
EFFECTIVE	8.580E-15	5.137E-12	9.053E-11	1.800E-16-1.000E+00	1.010E-09	2.560E-09
SKIN (FGR)	2.520E-14	5.565E-11	9.808E-10	1.950E-15-1.000E+00	0.000E+00	0.000E+00

## La-140

GONADS	1.140E-13	6.027E-11	4.425E-10	2.240E-15-1.000E+00	4.540E-10	1.340E-09
BREAST	1.290E-13	5.758E-11	4.228E-10	2.140E-15-1.000E+00	1.450E-10	1.800E-10
LUNGS	1.150E-13	5.596E-11	4.109E-10	2.080E-15-1.000E+00	4.210E-09	4.010E-11
RED MARR	1.140E-13	5.731E-11	4.208E-10	2.130E-15-1.000E+00	2.140E-10	2.810E-10
BONE SUR	1.690E-13	7.776E-11	5.709E-10	2.890E-15-1.000E+00	1.410E-10	9.770E-11
THYROID	1.180E-13	5.462E-11	4.010E-10	2.030E-15-1.000E+00	6.870E-11	6.400E-12
REMAINDER	1.110E-13	5.569E-11	4.089E-10	2.070E-15-1.000E+00	2.120E-09	6.260E-09
EFFECTIVE	1.170E-13	5.812E-11	4.267E-10	2.160E-15-1.000E+00	1.310E-09	2.280E-09
SKIN (FGR)	1.660E-13	2.217E-10	1.628E-09	8.240E-15-1.000E+00	0.000E+00	0.000E+00

## La-141

GONADS	2.330E-15	7.315E-13	9.675E-13	4.740E-17-1.000E+00	1.010E-11	3.770E-12
BREAST	2.640E-15	7.007E-13	9.267E-13	4.540E-17-1.000E+00	9.840E-12	7.070E-13
LUNGS	2.340E-15	6.713E-13	8.879E-13	4.350E-17-1.000E+00	6.460E-10	2.720E-13
RED MARR	2.310E-15	6.852E-13	9.063E-13	4.440E-17-1.000E+00	2.930E-11	1.070E-12
BONE SUR	3.490E-15	9.923E-13	1.312E-12	6.430E-17-1.000E+00	1.200E-10	6.060E-13
THYROID	2.390E-15	6.590E-13	8.716E-13	4.270E-17-1.000E+00	9.400E-12	5.290E-14
REMAINDER	2.260E-15	6.682E-13	8.838E-13	4.330E-17-1.000E+00	2.280E-10	1.240E-09
EFFECTIVE	2.390E-15	7.007E-13	9.267E-13	4.540E-17-1.000E+00	1.570E-10	3.740E-10
SKIN (FGR)	6.580E-14	1.667E-10	2.204E-10	1.080E-14-1.000E+00	0.000E+00	0.000E+00

## La-142

GONADS	1.400E-13	1.978E-11	2.034E-11	2.540E-15-1.000E+00	1.660E-11	6.990E-11
BREAST	1.570E-13	1.885E-11	1.938E-11	2.420E-15-1.000E+00	1.130E-11	1.540E-11
LUNGS	1.420E-13	1.846E-11	1.898E-11	2.370E-15-1.000E+00	3.010E-10	8.400E-12
RED MARR	1.420E-13	1.900E-11	1.954E-11	2.440E-15-1.000E+00	1.360E-11	1.930E-11
BONE SUR	1.950E-13	2.484E-11	2.554E-11	3.190E-15-1.000E+00	1.110E-11	7.400E-12
THYROID	1.450E-13	1.768E-11	1.818E-11	2.270E-15-1.000E+00	8.740E-12	1.160E-12
REMAINDER	1.380E-13	1.853E-11	1.906E-11	2.380E-15-1.000E+00	8.070E-11	5.200E-10
EFFECTIVE	1.440E-13	1.916E-11	1.970E-11	2.460E-15-1.000E+00	6.840E-11	1.790E-10
SKIN (FGR)	2.160E-13	9.111E-11	9.368E-11	1.170E-14-1.000E+00	0.000E+00	0.000E+00

## Ce-141

GONADS	3.380E-15	2.213E-12	4.332E-11	7.710E-17-1.000E+00	5.540E-11	1.080E-10
BREAST	3.930E-15	2.170E-12	4.247E-11	7.560E-17-1.000E+00	4.460E-11	1.110E-11
LUNGS	3.170E-15	1.951E-12	3.820E-11	6.800E-17-1.000E+00	1.670E-08	1.430E-12
RED MARR	2.830E-15	1.860E-12	3.641E-11	6.480E-17-1.000E+00	8.960E-11	3.390E-11
BONE SUR	9.410E-15	5.166E-12	1.011E-10	1.800E-16-1.000E+00	2.540E-10	2.300E-11
THYROID	3.350E-15	2.003E-12	3.922E-11	6.980E-17-1.000E+00	2.550E-11	1.800E-13
REMAINDER	2.980E-15	1.894E-12	3.708E-11	6.600E-17-1.000E+00	1.260E-09	2.500E-09
EFFECTIVE	3.430E-15	2.118E-12	4.146E-11	7.380E-17-1.000E+00	2.420E-09	7.830E-10
SKIN (FGR)	1.020E-14	3.788E-12	7.416E-11	1.320E-16-1.000E+00	0.000E+00	0.000E+00

## Ce-143

GONADS	1.280E-14	7.900E-12	4.958E-11	2.980E-16-1.000E+00	7.530E-11	2.120E-10
BREAST	1.470E-14	7.688E-12	4.825E-11	2.900E-16-1.000E+00	1.660E-11	2.320E-11
LUNGS	1.230E-14	6.893E-12	4.325E-11	2.600E-16-1.000E+00	3.880E-09	3.820E-12
RED MARR	1.170E-14	6.787E-12	4.259E-11	2.560E-16-1.000E+00	2.960E-11	5.070E-11
BONE SUR	2.520E-14	1.323E-11	8.302E-11	4.990E-16-1.000E+00	1.640E-11	1.610E-11

THYROID	1.280E-14	7.211E-12	4.525E-11	2.720E-16	-1.000E+00	6.230E-12	4.350E-13
REMAINDER	1.170E-14	6.734E-12	4.226E-11	2.540E-16	-1.000E+00	1.420E-09	3.890E-09
EFFECTIVE	1.290E-14	7.396E-12	4.642E-11	2.790E-16	-1.000E+00	9.160E-10	1.230E-09
SKIN (FGR)	3.960E-14	1.058E-10	6.638E-10	3.990E-15	-1.000E+00	0.000E+00	0.000E+00
Ce-144							
GONADS	2.725E-15	6.328E-13	1.319E-11	6.088E-17	-1.000E+00	2.390E-10	6.987E-11
BREAST	3.129E-15	6.274E-13	1.307E-11	5.922E-17	-1.000E+00	3.480E-10	1.223E-11
LUNGS	2.639E-15	5.228E-13	1.089E-11	5.362E-17	-1.000E+00	7.911E-07	6.551E-12
RED MARR	2.507E-15	4.755E-13	9.907E-12	5.247E-17	-1.000E+00	2.880E-09	8.923E-11
BONE SUR	5.441E-15	1.646E-12	3.429E-11	1.127E-16	-1.000E+00	4.720E-09	1.280E-10
THYROID	2.753E-15	5.529E-13	1.152E-11	5.418E-17	-1.000E+00	2.920E-10	5.154E-12
REMAINDER	2.534E-15	5.086E-13	1.060E-11	5.283E-17	-1.000E+00	1.910E-08	1.890E-08
EFFECTIVE	2.773E-15	5.909E-13	1.231E-11	5.766E-17	-1.000E+00	1.010E-07	5.711E-09
SKIN (FGR)	8.574E-14	7.648E-13	1.594E-11	1.250E-14	-1.000E+00	0.000E+00	0.000E+00
Pr-143							
GONADS	2.130E-17	2.264E-14	4.032E-13	7.930E-19	-1.000E+00	4.370E-18	8.990E-18
BREAST	2.550E-17	2.330E-14	4.149E-13	8.160E-19	-1.000E+00	2.220E-18	1.090E-18
LUNGS	1.860E-17	1.642E-14	2.923E-13	5.750E-19	-1.000E+00	1.330E-08	1.910E-19
RED MARR	1.620E-17	1.493E-14	2.659E-13	5.230E-19	-1.000E+00	1.480E-11	1.030E-12
BONE SUR	5.930E-17	5.454E-14	9.711E-13	1.910E-18	-1.000E+00	1.490E-11	1.030E-12
THYROID	2.050E-17	1.802E-14	3.208E-13	6.310E-19	-1.000E+00	1.680E-18	2.660E-20
REMAINDER	1.760E-17	1.642E-14	2.923E-13	5.750E-19	-1.000E+00	1.970E-09	4.220E-09
EFFECTIVE	2.100E-17	2.002E-14	3.564E-13	7.010E-19	-1.000E+00	2.190E-09	1.270E-09
SKIN (FGR)	1.760E-14	5.711E-11	1.017E-09	2.000E-15	-1.000E+00	0.000E+00	0.000E+00
Nd-147							
GONADS	6.130E-15	4.218E-12	7.235E-11	1.480E-16	-1.000E+00	8.410E-11	1.790E-10
BREAST	7.120E-15	4.132E-12	7.088E-11	1.450E-16	-1.000E+00	3.450E-11	1.870E-11
LUNGS	5.820E-15	3.648E-12	6.257E-11	1.280E-16	-1.000E+00	1.060E-08	2.440E-12
RED MARR	5.400E-15	3.505E-12	6.013E-11	1.230E-16	-1.000E+00	9.190E-11	5.050E-11
BONE SUR	1.320E-14	8.265E-12	1.418E-10	2.900E-16	-1.000E+00	3.260E-10	2.220E-11
THYROID	6.120E-15	3.876E-12	6.648E-11	1.360E-16	-1.000E+00	1.820E-11	2.640E-13
REMAINDER	5.530E-15	3.562E-12	6.111E-11	1.250E-16	-1.000E+00	1.760E-09	3.760E-09
EFFECTIVE	6.190E-15	3.961E-12	6.795E-11	1.390E-16	-1.000E+00	1.850E-09	1.180E-09
SKIN (FGR)	1.950E-14	3.135E-11	5.377E-10	1.100E-15	-1.000E+00	0.000E+00	0.000E+00
Np-239							
GONADS	7.530E-15	4.691E-12	4.380E-11	1.710E-16	-1.000E+00	7.450E-11	1.620E-10
BREAST	8.730E-15	4.636E-12	4.329E-11	1.690E-16	-1.000E+00	1.630E-11	1.720E-11
LUNGS	7.180E-15	4.115E-12	3.842E-11	1.500E-16	-1.000E+00	2.360E-09	2.400E-12
RED MARR	6.500E-15	4.005E-12	3.740E-11	1.460E-16	-1.000E+00	2.080E-10	4.660E-11
BONE SUR	2.000E-14	1.001E-11	9.349E-11	3.650E-16	-1.000E+00	2.030E-09	3.590E-11
THYROID	7.520E-15	4.197E-12	3.919E-11	1.530E-16	-1.000E+00	7.620E-12	2.070E-13
REMAINDER	6.760E-15	4.005E-12	3.740E-11	1.460E-16	-1.000E+00	9.590E-10	2.770E-09
EFFECTIVE	7.690E-15	4.471E-12	4.175E-11	1.630E-16	-1.000E+00	6.780E-10	8.820E-10
SKIN (FGR)	1.600E-14	7.215E-12	6.737E-11	2.630E-16	-1.000E+00	0.000E+00	0.000E+00
Pu-238							
GONADS	6.560E-18	4.291E-14	9.011E-13	1.490E-18	-1.000E+00	1.040E-05	2.330E-09
BREAST	1.270E-17	5.558E-14	1.167E-12	1.930E-18	-1.000E+00	4.400E-10	1.800E-13
LUNGS	1.060E-18	2.267E-15	4.759E-14	7.870E-20	-1.000E+00	3.200E-04	8.640E-14
RED MARR	1.680E-18	5.587E-15	1.173E-13	1.940E-19	-1.000E+00	5.800E-05	1.270E-08
BONE SUR	9.300E-18	3.514E-14	7.378E-13	1.220E-18	-1.000E+00	7.250E-04	1.580E-07
THYROID	4.010E-18	9.792E-15	2.056E-13	3.400E-19	-1.000E+00	3.860E-10	7.990E-14
REMAINDER	1.990E-18	9.216E-15	1.935E-13	3.200E-19	-1.000E+00	2.740E-05	2.180E-08
EFFECTIVE	4.880E-18	2.413E-14	5.068E-13	8.380E-19	-1.000E+00	7.790E-05	1.340E-08
SKIN (FGR)	4.090E-17	2.776E-13	5.830E-12	9.640E-18	-1.000E+00	0.000E+00	0.000E+00
Pu-239							
GONADS	4.840E-18	1.768E-14	3.713E-13	6.140E-19	-1.000E+00	1.200E-05	2.640E-09

BREAST	7.550E-18	2.238E-14	4.699E-13	7.770E-19	-1.000E+00	3.990E-10	1.210E-13
LUNGS	2.650E-18	2.267E-15	4.760E-14	7.870E-20	-1.000E+00	3.230E-04	7.890E-14
RED MARR	2.670E-18	3.456E-15	7.258E-14	1.200E-19	-1.000E+00	6.570E-05	1.410E-08
BONE SUR	9.470E-18	1.673E-14	3.514E-13	5.810E-19	-1.000E+00	8.210E-04	1.760E-07
THYROID	3.880E-18	5.126E-15	1.077E-13	1.780E-19	-1.000E+00	3.750E-10	7.500E-14
REMAINDER	2.860E-18	4.838E-15	1.016E-13	1.680E-19	-1.000E+00	3.020E-05	2.120E-08
EFFECTIVE	4.240E-18	1.057E-14	2.220E-13	3.670E-19	-1.000E+00	8.330E-05	1.400E-08
SKIN (FGR)	1.860E-17	1.057E-13	2.220E-12	3.670E-18	-1.000E+00	0.000E+00	0.000E+00

**Appendix C4. Oyster Creek RADTRAD input (.psf) files****File rev1dw1\_env.psf**

```
Radtrad 3.03 4/15/2001
Oyster Creek - Path MSIV 1
Nuclide Inventory File:
F:\radtrad303\oyster creek 2007\8pt7oc60.nif
Plant Power Level:
1.9690E+03
Compartments:
8
Compartment 1:
DW
3
1.8000E+05
1
0
0
0
0
Compartment 2:
WW
3
1.2800E+05
0
0
0
1
0
Compartment 3:
RB
3
1.3000E+03
0
0
0
0
0
Compartment 4:
SP
3
8.2000E+04
0
0
0
0
0
Compartment 5:
CR
1
2.7500E+04
0
0
0
0
```

PSAT 05201H.08

```
0
Compartment 6:
Enviro
2
0.0000E+00
0
0
0
0
0
0
Compartment 7:
Dummy
3
1.0000E+06
0
0
0
0
0
0
Compartment 8:
SL
3
32.36
0
0
0
1
0
Pathways:
14
Pathway 1:
DW to WW
1
2
2
Pathway 2:
WW to DW
2
1
2
Pathway 3:
Bypass DW 1 to Env
1
6
2
Pathway 4:
DW to RB
1
3
2
Pathway 5:
WW to RB
2
3
2
Pathway 6:
```

SP to RB

2  
3  
2

Pathway 7:

Bypass DW 3 to Dummy

1  
7  
2

Pathway 8:

Bypass WW to Dummy

2  
7  
2

Pathway 9:

RB SGT5 to Dummy

3  
7  
2

Pathway 10:

Enviro to CR

6  
5  
2

Pathway 11:

CR to Enviro

5  
6  
2

Pathway 12:

SL to Dummy

8  
7  
2

Pathway 13:

DW to SL

1  
8  
2

Pathway 14:

Bypass DW 2 to Dummy

1  
7  
2

End of Plant Model File

Scenario Description Name:

Plant Model Filename:

Source Term:

1

1 1.0000E+00

F:\radtrad303\oyster creek 2007\oc60.inp

F:\radtrad303\oyster creek 2007\oc.rft

0.0000E+00

1

9.5000E-01 4.8500E-02 1.5000E-03 1.0000E+00  
 Overlying Pool:

0  
 0.0000E+00  
 0  
 0  
 0  
 0

Compartments:  
 8

Compartment 1:

0  
 1  
 1  
 0.0000E+00  
 9  
 1.6630E-01 25.234E+00  
 4.6450E-01 0.2725E+00  
 7.0190E-01 43.141E+00  
 9.3360E-01 0.3249E+00  
 1.1291E+00 26.366E+00  
 2.0073E+00 6.2487E+00  
 3.7749E+00 6.4500E-02  
 4.6334E+00 3.9924E+00  
 7.7909E+00 1.9970E-01

1  
 0.0000E+00  
 9  
 1.6630E-01 25.234E+00  
 4.6450E-01 0.2725E+00  
 7.0190E-01 43.141E+00  
 9.3360E-01 0.3249E+00  
 1.1291E+00 26.366E+00  
 2.0073E+00 6.2487E+00  
 3.7749E+00 6.4500E-02  
 4.6334E+00 3.9924E+00  
 7.7909E+00 1.9970E-01

1  
 0.0000E+00  
 0  
 0  
 0  
 0  
 0

Compartment 2:

0  
 1  
 0  
 0  
 0  
 0  
 0  
 1  
 5  
 1.1290E+00 1.5000E+00  
 3.7780E+00 0.0000E+00

5.2220E+00 1.5000E-01  
7.8440E+00 0.0000E+00  
7.2000E+02 0.0000E+00  
1  
5  
1.1290E+00 1.5000E+00  
3.7780E+00 0.0000E+00  
5.2220E+00 1.5000E-01  
7.8440E+00 0.0000E+00  
7.2000E+02 0.0000E+00

Compartment 3:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 4:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 5:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 6:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 7:

0  
1  
0  
0  
0

```

0
0
0
0
Compartment 8:
0
1
0
0
0
0
0
1
9
0.0800E-01  1.3604E+00
5.1170E-01  2.5427E+00
1.0089E+00  2.4120E+00
2.2385E+00  2.5895E+00
2.8033E+00  2.1079E+00
3.0875E+00  1.3937E+00
5.0413E+00  0.6557E+00
9.8705E+00  0.3799E+00
2.4000E+01  0.0000E+00
1
9
0.0800E-01  0.0000E+00
5.1170E-01  0.0000E+00
1.0089E+00  0.0000E+00
2.2385E+00  0.0000E+00
2.8033E+00  0.0000E+00
3.0875E+00  0.0000E+00
5.0413E+00  0.0000E+00
9.8705E+00  0.0000E+00
2.4000E+01  0.0000E+00
Pathways:
14
Pathway 1:
0
0
0
0
0
1
4
1.1290E+00  9.1800E+03  0.0000E+00  0.0000E+00  0.0000E+00
1.2960E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
2.0080E+00  3.0000E+04  0.0000E+00  0.0000E+00  0.0000E+00
7.2000E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0
0
0
0
0
0
0
Pathway 2:
0

```

0  
0  
0  
0  
1  
4  
0  
0  
0  
0  
0  
0  
0  
0

1.2960E+00	9.1800E+03	0.0000E+00	0.0000E+00	0.0000E+00
1.4630E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
2.0080E+00	3.0000E+04	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Pathway 3:

0  
0  
0  
0  
0  
1  
2  
0  
0  
0  
0  
0  
0  
0

0.0000E+00	1.2000E-01	50.000E+00	5.0000E+01	0.0000E+00
1.5300E+01	6.0000E-02	50.000E+00	5.0000E+01	0.0000E+00

Pathway 4:

0  
0  
0  
0  
0  
1  
2  
0  
0  
0  
0  
0  
0  
0

0.0000E+00	9.6000E-01	0.0000E+00	0.0000E+00	0.0000E+00
2.4000E+01	4.8000E-01	0.0000E+00	0.0000E+00	0.0000E+00

Pathway 5:

0  
0  
0  
0  
0  
1  
2

0.0000E+00	7.6000E-01	0.0000E+00	0.0000E+00	0.0000E+00
2.4000E+01	3.8000E-01	0.0000E+00	0.0000E+00	0.0000E+00

0  
0  
0  
0  
0  
0

Pathway 6:

0  
0  
0  
0  
0  
1  
2

0.0000E+00	0.1300E+00	9.0000E+01	9.0000E+01	9.0000E+01
7.2000E+02	0.1300E+00	9.0000E+01	9.0000E+01	9.0000E+01

0  
0  
0  
0  
0

Pathway 7:

0  
0  
0  
0  
0  
1  
2

0.0000E+00	3.0100E-02	9.1600E+01	5.0000E+01	0.0000E+00
2.4000E+01	1.5050E-02	9.1600E+01	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0

Pathway 8:

0  
0  
0  
0  
0  
1  
2

0.0000E+00	1.3200E-01	9.1600E+01	5.0000E+01	0.0000E+00
2.4000E+01	6.6000E-02	9.1600E+01	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0

Pathway 9:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 2.6000E+03 9.0000E+01 9.0000E+01 9.0000E+01  
 7.2000E+02 2.6000E+03 9.0000E+01 9.0000E+01 9.0000E+01  
 0  
 0  
 0  
 0  
 0  
 0

Pathway 10:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
 7.2000E+02 1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
 0  
 0  
 0  
 0  
 0  
 0

Pathway 11:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
 7.2000E+02 1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
 0  
 0  
 0  
 0  
 0  
 0

Pathway 12:

0  
 0  
 0  
 0  
 0  
 1  
 2

0.0000E+00	1.7000E-01	0.0000E+00	5.0000E+01	0.0000E+00
2.4000E+01	8.5000E-02	0.0000E+00	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0  
0

Pathway 13:

0  
0  
0  
0  
0  
1  
2

0.0000E+00	9.5000E-02	0.0000E+00	0.0000E+00	0.0000E+00
2.4000E+01	4.7500E-02	0.0000E+00	0.0000E+00	0.0000E+00

0  
0  
0  
0  
0

Pathway 14:

0  
0  
0  
0  
0  
1  
2

0.0000E+00	4.5000E-02	9.6500E+01	5.0000E+01	0.0000E+00
2.4000E+01	2.2500E-02	9.6500E+01	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0

Dose Locations:

3

Location 1:

CR

5  
0  
1  
2

0.0080E+00	3.4700E-04
7.2000E+02	3.4700E-04

1  
4

0.0000E+00	1.0000E+00
1.5300E+01	2.5000E-01
8.7300E+01	2.5000E-01
7.1130E+02	2.5000E-01

Location 2:

EAB

6		
1		
2		
0.0000E+00	0.0000E+00	
7.1130E+02	0.0000E+00	
1		
4		
0.0080E+00	3.4700E-04	
8.0000E+00	3.4700E-04	
2.4000E+01	0.0000E+00	
7.2000E+02	0.0000E+00	
0		

Location 3:

LPZ

6		
1		
4		
0.0000E+00	4.2300E-05	
1.5300E+01	1.8200E-05	
8.7300E+01	5.4300E-06	
7.1130E+02	0.0000E+00	
1		
7		
0.0080E+00	3.4700E-04	
8.0000E+00	1.7500E-04	
1.5300E+01	1.7500E-04	
2.4000E+01	2.3200E-04	
8.7300E+01	2.3200E-04	
7.1130E+02	2.3200E-04	
7.2000E+02	2.3200E-04	
0		

Effective Volume Location:

1		
5		
0.0000E+00	2.7100E-03	
8.0000E+00	8.7600E-04	
1.5300E+01	8.6300E-04	
8.7300E+01	8.4500E-04	
7.1130E+02	8.4500E-04	

Simulation Parameters:

6		
0.0000E+00	5.0000E-03	
4.0000E+00	5.0000E-01	
8.0000E+00	1.0000E+00	
2.4000E+01	2.0000E+00	
4.8000E+01	2.4000E+01	
7.2000E+02	0.0000E+00	

Output Filename:

F:\radtrad303\newrun\2004oc\oc3.o0

1  
1  
1  
1  
1

End of Scenario File

**File rev1dw2\_env.psf**

```
Radtrad 3.03 4/15/2001
Oyster Creek - Path MSIV 1
Nuclide Inventory File:
F:\radtrad303\oyster creek 2007\oc60.nif
Plant Power Level:
  1.9690E+03
Compartments:
  8
Compartment 1:
DW
  3
  1.8000E+05
  1
  0
  0
  0
  0
Compartment 2:
WW
  3
  1.2800E+05
  0
  0
  0
  1
  0
Compartment 3:
RB
  3
  1.3000E+03
  0
  0
  0
  0
  0
Compartment 4:
SP
  3
  8.2000E+04
  0
  0
  0
  0
  0
Compartment 5:
CR
  1
  2.7500E+04
  0
  0
  0
  0
  0
Compartment 6:
```

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Enviro

2  
0.0000E+00  
0  
0  
0  
0  
0

Compartment 7:

Dummy

3  
1.0000E+06  
0  
0  
0  
0  
0

Compartment 8:

SL

3  
32.36  
0  
0  
0  
1  
0

Pathways:

14

Pathway 1:

DW to WW

1  
2  
2

Pathway 2:

WW to DW

2  
1  
2

Pathway 3:

Bypass DW 1 to Dummy

1  
7  
2

Pathway 4:

DW to RB

1  
3  
2

Pathway 5:

WW to RB

2  
3  
2

Pathway 6:

SP to RB

2

3  
2  
Pathway 7:  
Bypass DW 3 to Dummy  
1  
7  
2  
Pathway 8:  
Bypass WW to Dummy  
2  
7  
2  
Pathway 9:  
RB SGTS to Dummy  
3  
7  
2  
Pathway 10:  
Enviro to CR  
6  
5  
2  
Pathway 11:  
CR to Enviro  
5  
6  
2  
Pathway 12:  
SL to Dummy  
8  
7  
2  
Pathway 13:  
DW to SL  
1  
8  
2  
Pathway 14:  
Bypass DW 2 to Env.  
1  
6  
2  
End of Plant Model File  
Scenario Description Name:  
  
Plant Model Filename:  
  
Source Term:  
1  
1 1.0000E+00  
F:\radtrad303\oyster creek 2007\oc60.inp  
F:\radtrad303\oyster creek 2007\oc.rft  
0.0000E+00  
1  
9.5000E-01 4.8500E-02 1.5000E-03 1.0000E+00  
Overlying Pool:

```

0
0.0000E+00
0
0
0
0
Compartments:
8
Compartment 1:
0
1
1
0.0000E+00
9
1.6630E-01      25.234E+00
4.6450E-01      0.2725E+00
7.0190E-01      43.141E+00
9.3360E-01      0.3249E+00
1.1291E+00      26.366E+00
2.0073E+00      6.2487E+00
3.7749E+00      6.4500E-02
4.6334E+00      3.9924E+00
7.7909E+00      1.9970E-01
1
0.0000E+00
9
1.6630E-01      25.234E+00
4.6450E-01      0.2725E+00
7.0190E-01      43.141E+00
9.3360E-01      0.3249E+00
1.1291E+00      26.366E+00
2.0073E+00      6.2487E+00
3.7749E+00      6.4500E-02
4.6334E+00      3.9924E+00
7.7909E+00      1.9970E-01
1
0.0000E+00
0
0
0
0
0
0
0
0
0
0
Compartment 2:
0
1
0
0
0
0
0
0
1
5
1.1290E+00      1.5000E+00
3.7780E+00      0.0000E+00
5.2220E+00      1.5000E-01
7.8440E+00      0.0000E+00

```

7.2000E+02 0.0000E+00  
1  
5  
1.1290E+00 1.5000E+00  
3.7780E+00 0.0000E+00  
5.2220E+00 1.5000E-01  
7.8440E+00 0.0000E+00  
7.2000E+02 0.0000E+00

Compartment 3:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 4:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 5:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 6:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 7:

0  
1  
0  
0  
0  
0  
0

```

0
0
Compartment 8:
0
1
0
0
0
0
0
1
9
0.0800E-01  1.3604E+00
5.1170E-01  2.5427E+00
1.0089E+00  2.4120E+00
2.2385E+00  2.5895E+00
2.8033E+00  2.1079E+00
3.0875E+00  1.3937E+00
5.0413E+00  0.6557E+00
9.8705E+00  0.3799E+00
2.4000E+01  0.0000E+00
1
9
0.0800E-01  0.0000E+00
5.1170E-01  0.0000E+00
1.0089E+00  0.0000E+00
2.2385E+00  0.0000E+00
2.8033E+00  0.0000E+00
3.0875E+00  0.0000E+00
5.0413E+00  0.0000E+00
9.8705E+00  0.0000E+00
2.4000E+01  0.0000E+00

```

Pathways:

14

Pathway 1:

```

0
0
0
0
0
0
1
4
1.1290E+00  9.1800E+03  0.0000E+00  0.0000E+00  0.0000E+00
1.2960E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
2.0080E+00  3.0000E+04  0.0000E+00  0.0000E+00  0.0000E+00
7.2000E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0
0
0
0
0
0
0

```

Pathway 2:

```

0
0
0

```

0  
 0  
 1  
 4  
 1.2960E+00 9.1800E+03 0.0000E+00 0.0000E+00 0.0000E+00  
 1.4630E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00  
 2.0080E+00 3.0000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
 7.2000E+02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

0  
 0  
 0  
 0  
 0

Pathway 3:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0080E+00 1.2000E-01 50.000E+00 5.0000E+01 0.0000E+00  
 2.4000E+01 6.0000E-02 50.000E+00 5.0000E+01 0.0000E+00

0  
 0  
 0  
 0  
 0

Pathway 4:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 9.6000E-01 0.0000E+00 0.0000E+00 0.0000E+00  
 2.4000E+01 4.8000E-01 0.0000E+00 0.0000E+00 0.0000E+00

0  
 0  
 0  
 0  
 0

Pathway 5:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0080E+00 7.6000E-01 0.0000E+00 0.0000E+00 0.0000E+00  
 2.4000E+01 3.8000E-01 0.0000E+00 0.0000E+00 0.0000E+00

```

0
0
0
0
0
0
0
Pathway 6:
0
0
0
0
0
0
1
2
0.0080E+00  0.1300E+00  9.0000E+01  9.0000E+01  9.0000E+01
7.2000E+02  0.1300E+00  9.0000E+01  9.0000E+01  9.0000E+01
0
0
0
0
0
0
Pathway 7:
0
0
0
0
0
0
1
2
0.0080E+00  3.0100E-02  9.1600E+01  5.0000E+01  0.0000E+00
2.4000E+01  1.5050E-02  9.1600E+01  5.0000E+01  0.0000E+00
0
0
0
0
0
0
Pathway 8:
0
0
0
0
0
0
1
2
0.0080E+00  1.3200E-01  9.1600E+01  5.0000E+01  0.0000E+00
2.4000E+01  6.6000E-02  9.1600E+01  5.0000E+01  0.0000E+00
0
0
0
0
0
0
Pathway 9:
0

```

0  
0  
0  
0  
1  
2  
0  
7.2000E+02  
0  
0  
0  
0  
0  
0

Pathway 10:

0  
0  
0  
0  
0  
1  
2  
0  
7.2000E+02  
0  
0  
0  
0  
0  
0

Pathway 11:

0  
0  
0  
0  
0  
1  
2  
0  
7.2000E+02  
0  
0  
0  
0  
0  
0

Pathway 12:

0  
0  
0  
0  
0  
1  
2  
0  
2.4000E+01

0.0080E+00	2.6000E+03	9.0000E+01	9.0000E+01	9.0000E+01
7.2000E+02	2.6000E+03	9.0000E+01	9.0000E+01	9.0000E+01

0.0000E+00	1.4000E+04	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	1.4000E+04	0.0000E+00	0.0000E+00	0.0000E+00

0.0000E+00	1.4000E+04	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	1.4000E+04	0.0000E+00	0.0000E+00	0.0000E+00

0.0080E+00	1.7000E-01	0.0000E+00	5.0000E+01	0.0000E+00
2.4000E+01	8.5000E-02	0.0000E+00	5.0000E+01	0.0000E+00

0  
 0  
 0  
 0  
 0  
 0  
 Pathway 13:  
 0  
 0  
 0  
 0  
 0  
 1  
 2  

0.0080E+00	9.5000E-02	0.0000E+00	0.0000E+00	0.0000E+00
2.4000E+01	4.7500E-02	0.0000E+00	0.0000E+00	0.0000E+00

0  
 0  
 0  
 0  
 0

Pathway 14:  
 0  
 0  
 0  
 0  
 0  
 1  
 2  

0.0080E+00	4.5000E-02	9.6500E+01	5.0000E+01	0.0000E+00
2.4000E+01	2.2500E-02	9.6500E+01	5.0000E+01	0.0000E+00

0  
 0  
 0  
 0  
 0

Dose Locations:  
 3  
 Location 1:  
 CR  
 5  
 0  
 1  
 2  

0.0080E+00	3.4700E-04
7.2000E+02	3.4700E-04

 1  
 4  

0.0080E+00	1.0000E+00
2.4000E+01	2.5000E-01
9.6000E+01	2.5000E-01
7.2000E+02	2.5000E-01

 Location 2:  
 EAB

6  
 1  
 4  
 0.0000E+00    0.0000E+00  
 1.5000E+00    1.4100E-03  
 3.5000E+00    0.0000E+00  
 7.2000E+02    0.0000E+00  
 1  
 4  
 0.0080E+00    3.4700E-04  
 8.0000E+00    3.4700E-04  
 2.4000E+01    0.0000E+00  
 7.2000E+02    0.0000E+00  
 0

Location 3:

LPZ

6  
 1  
 9  
 0.0000E+00    6.2300E-05  
 1.5000E+00    1.3500E-04  
 3.5000E+00    6.2300E-05  
 8.0000E+00    4.2300E-05  
 8.7000E+00    4.2300E-05  
 1.6700E+01    4.2300E-05  
 2.4000E+01    1.8200E-05  
 9.6000E+01    5.4300E-06  
 7.2000E+02    0.0000E+00  
 1  
 4  
 0.0080E+00    3.4700E-04  
 8.0000E+00    1.7500E-04  
 2.4000E+01    2.3200E-04  
 7.2000E+02    2.3200E-04  
 0

Effective Volume Location:

1  
 6  
 0.0000E+00    8.7600E-04  
 8.7000E+00    2.7100E-03  
 1.6700E+01    8.7600E-04  
 2.4000E+01    8.6300E-04  
 9.6000E+01    8.4500E-04  
 7.2000E+02    8.4500E-04

Simulation Parameters:

6  
 0.0000E+00    5.0000E-03  
 4.0000E+00    5.0000E-01  
 8.0000E+00    1.0000E+00  
 2.4000E+01    2.0000E+00  
 4.8000E+01    2.4000E+01  
 7.2000E+02    0.0000E+00

Output Filename:

F:\radtrad303\newrun\2004oc\oc3.o0

1  
 1

1  
1  
1  
End of Scenario File

**File rev1dw3\_env.psf**

```
Radtrad 3.03 4/15/2001
Oyster Creek - Path RB(DW)
Nuclide Inventory File:
F:\radtrad303\oyster creek 2007\oc60.nif
Plant Power Level:
  1.9690E+03
Compartments:
  8
Compartment 1:
DW
  3
  1.8000E+05
  1
  0
  0
  0
  0
Compartment 2:
WW
  3
  1.2800E+05
  0
  0
  0
  1
  0
Compartment 3:
RB
  3
  1.3000E+03
  0
  0
  0
  0
  0
Compartment 4:
SP
  3
  8.2000E+04
  0
  0
  0
  0
  0
Compartment 5:
CR
  1
  2.7500E+04
  0
  0
  0
  0
  0
Compartment 6:
```

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Enviro

2

0.0000E+00

0

0

0

0

0

Compartment 7:

Dummy

3

1.0000E+06

0

0

0

0

0

Compartment 8:

SL

3

32.36

0

0

0

1

0

Pathways:

14

Pathway 1:

DW to WW

1

2

2

Pathway 2:

WW to DW

2

1

2

Pathway 3:

Bypass DW 1 to Dummy

1

7

2

Pathway 4:

DW to RB

1

3

2

Pathway 5:

WW to RB

2

3

2

Pathway 6:

SP to RB

2

```

3
2
Pathway 7:
Leakage DW 3 to Enviro
1
6
2
Pathway 8:
Bypass WW to Dummy
2
7
2
Pathway 9:
RB SGTS to Dummy
3
7
2
Pathway 10:
Enviro to CR
6
5
2
Pathway 11:
CR to Enviro
5
6
2
Pathway 12:
Leaking SL to Dummy
8
7
2
Pathway 13:
DW to SL
1
8
2
Pathway 14:
Bypass DW 2 to Dummy
1
7
2
End of Plant Model File
Scenario Description NamF:

Plant Model FilenamF:

Source Term:
1
1 1.0000E+00
F:\radtrad303\oyster creek 2007\oc60.inp
F:\radtrad303\oyster creek 2007\oc.rft
0.0000E+00
1
9.5000E-01 4.8500E-02 1.5000E-03 1.0000E+00
Overlying Pool:

```

0  
0.0000E+00  
0  
0  
0  
0  
Compartments:  
8  
Compartment 1:  
0  
1  
1  
0.0000E+00  
9  
1.6630E-01      25.234E+00  
4.6450E-01      0.2725E+00  
7.0190E-01      43.141E+00  
9.3360E-01      0.3249E+00  
1.1291E+00      26.366E+00  
2.0073E+00      6.2487E+00  
3.7749E+00      6.4500E-02  
4.6334E+00      3.9924E+00  
7.7909E+00      1.9970E-01  
1  
0.0000E+00  
9  
1.6630E-01      25.234E+00  
4.6450E-01      0.2725E+00  
7.0190E-01      43.141E+00  
9.3360E-01      0.3249E+00  
1.1291E+00      26.366E+00  
2.0073E+00      6.2487E+00  
3.7749E+00      6.4500E-02  
4.6334E+00      3.9924E+00  
7.7909E+00      1.9970E-01  
1  
0.0000E+00  
0  
0  
0  
0  
0  
0  
Compartment 2:  
0  
1  
0  
0  
0  
0  
0  
0  
1  
5  
1.1290E+00    1.5000E+00  
3.7780E+00    0.0000E+00  
5.2220E+00    1.5000E-01  
7.8440E+00    0.0000E+00

7.2000E+02 0.0000E+00  
1  
5  
1.1290E+00 1.5000E+00  
3.7780E+00 0.0000E+00  
5.2220E+00 1.5000E-01  
7.8440E+00 0.0000E+00  
7.2000E+02 0.0000E+00

Compartment 3:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 4:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 5:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 6:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 7:

0  
1  
0  
0  
0  
0  
0

```

0
0
Compartment 8:
0
1
0
0
0
0
0
1
9
0.0800E-01  1.3604E+00
5.1170E-01  2.5427E+00
1.0089E+00  2.4120E+00
2.2385E+00  2.5895E+00
2.8033E+00  2.1079E+00
3.0875E+00  1.3937E+00
5.0413E+00  0.6557E+00
9.8705E+00  0.3799E+00
2.4000E+01  0.0000E+00
1
9
0.0800E-01  0.0000E+00
5.1170E-01  0.0000E+00
1.0089E+00  0.0000E+00
2.2385E+00  0.0000E+00
2.8033E+00  0.0000E+00
3.0875E+00  0.0000E+00
5.0413E+00  0.0000E+00
9.8705E+00  0.0000E+00
2.4000E+01  0.0000E+00

```

Pathways:

```

14
Pathway 1:
0
0
0
0
0
1
4
1.1290E+00  9.1800E+03  0.0000E+00  0.0000E+00  0.0000E+00
1.2960E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
2.0080E+00  3.0000E+04  0.0000E+00  0.0000E+00  0.0000E+00
7.2000E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0
0
0
0
0
0
0
Pathway 2:
0
0
0

```

0  
 0  
 1  
 4  
 1.2960E+00 9.1800E+03 0.0000E+00 0.0000E+00 0.0000E+00  
 1.4630E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00  
 2.0080E+00 3.0000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
 7.2000E+02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

0  
 0  
 0  
 0  
 0  
 0

Pathway 3:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 1.2000E-01 50.000E+00 5.0000E+01 0.0000E+00  
 2.4000E+01 6.0000E-02 50.000E+00 5.0000E+01 0.0000E+00

0  
 0  
 0  
 0  
 0  
 0

Pathway 4:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 9.6000E-01 0.0000E+00 0.0000E+00 0.0000E+00  
 2.4000E+01 4.8000E-01 0.0000E+00 0.0000E+00 0.0000E+00

0  
 0  
 0  
 0  
 0  
 0

Pathway 5:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 7.6000E-01 0.0000E+00 0.0000E+00 0.0000E+00  
 2.4000E+01 3.8000E-01 0.0000E+00 0.0000E+00 0.0000E+00

0  
0  
0  
0  
0  
0

Pathway 6:

0  
0  
0  
0  
0

1

2

0.0000E+00	0.1300E+00	9.0000E+01	9.0000E+01	9.0000E+01
7.2000E+02	0.1300E+00	9.0000E+01	9.0000E+01	9.0000E+01

0  
0  
0  
0  
0  
0

Pathway 7:

0  
0  
0  
0  
0

1

2

0.0000E+00	3.0100E-02	9.1600E+01	5.0000E+01	0.0000E+00
2.4000E+01	1.5050E-02	9.1600E+01	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0  
0

Pathway 8:

0  
0  
0  
0  
0

1

2

0.0000E+00	1.3200E-01	9.1600E+01	5.0000E+01	0.0000E+00
2.4000E+01	6.6000E-02	9.1600E+01	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0  
0

Pathway 9:

0

0  
0  
0  
0  
1  
2  
0  
7.2000E+02  
0  
0  
0  
0  
0  
0

Pathway 10:

0  
0  
0  
0  
0  
1  
2  
0  
7.2000E+02  
0  
0  
0  
0  
0  
0

Pathway 11:

0  
0  
0  
0  
0  
1  
2  
0  
7.2000E+02  
0  
0  
0  
0  
0  
0

Pathway 12:

0  
0  
0  
0  
0  
1  
2  
0  
2.4000E+01

0.0000E+00	2.6000E+03	9.0000E+01	9.0000E+01	9.0000E+01
7.2000E+02	2.6000E+03	9.0000E+01	9.0000E+01	9.0000E+01

0.0000E+00	1.4000E+04	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	1.4000E+04	0.0000E+00	0.0000E+00	0.0000E+00

0.0000E+00	1.4000E+04	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	1.4000E+04	0.0000E+00	0.0000E+00	0.0000E+00

0.0000E+00	1.7000E-01	0.0000E+00	5.0000E+01	0.0000E+00
2.4000E+01	8.5000E-02	0.0000E+00	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0  
0  
Pathway 13:  
0  
0  
0  
0  
0  
1  
2  
0.0000E+00 9.5000E-02 0.0000E+00 0.0000E+00 0.0000E+00  
2.4000E+01 4.7500E-02 0.0000E+00 0.0000E+00 0.0000E+00  
0  
0  
0  
0  
0

Pathway 14:  
0  
0  
0  
0  
0  
1  
2  
0.0000E+00 4.5000E-02 9.6500E+01 5.0000E+01 0.0000E+00  
2.4000E+01 2.2500E-02 9.6500E+01 5.0000E+01 0.0000E+00  
0  
0  
0  
0  
0  
0

Dose Locations:

3  
Location 1:  
CR  
5  
0  
1  
2  
0.0080E+00 3.4700E-04  
7.2000E+02 3.4700E-04  
1  
4  
0.0080E+00 1.0000E+00  
2.4000E+01 2.5000E-01  
9.6000E+01 2.5000E-01  
7.2000E+02 2.5000E-01

Location 2:

EAB

6  
 1  
 4  
 0.0000E+00    0.0000E+00  
 1.5000E+00    1.4100E-03  
 3.5000E+00    0.0000E+00  
 7.2000E+02    0.0000E+00

1  
 4  
 0.0080E+00    3.4700E-04  
 8.0000E+00    3.4700E-04  
 2.4000E+01    0.0000E+00  
 7.2000E+02    0.0000E+00

0  
 Location 3:  
 LPZ

6  
 1  
 9  
 0.0000E+00    6.2300E-05  
 1.5000E+00    1.3500E-04  
 3.5000E+00    6.2300E-05  
 8.0000E+00    4.2300E-05  
 8.7000E+00    4.2300E-05  
 1.6700E+01    4.2300E-05  
 2.4000E+01    1.8200E-05  
 9.6000E+01    5.4300E-06  
 7.2000E+02    0.0000E+00

1  
 4  
 0.0000E+00    3.4700E-04  
 8.0000E+00    1.7500E-04  
 2.4000E+01    2.3200E-04  
 7.2000E+02    2.3200E-04

0  
 Effective Volume Location:

1  
 6  
 0.0000E+00    1.1500E-03  
 8.7000E+00    2.5900E-03  
 1.6700E+01    1.1500E-03  
 2.4000E+01    8.4400E-04  
 9.6000E+01    7.1800E-04  
 7.2000E+02    7.1800E-04

Simulation Parameters:

6  
 0.0000E+00    5.0000E-03  
 4.0000E+00    5.0000E-01  
 8.0000E+00    1.0000E+00  
 2.4000E+01    2.0000E+00  
 4.8000E+01    2.4000E+01  
 7.2000E+02    0.0000E+00

Output Filename:

F:\radtrad303\newrun\2004oc\oc3.o0

1  
 1

1  
1  
1  
End of Scenario File

**File rev1ww\_env.psf**

Radtrad 3.03 4/15/2001  
Oyster Creek - Path RB(WW)  
Nuclide Inventory File:  
F:\radtrad303\oyster creek 2007\oc60.nif  
Plant Power Level:  
1.9690E+03  
Compartments:  
8  
Compartment 1:  
DW  
3  
1.8000E+05  
1  
0  
0  
0  
0  
Compartment 2:  
WW  
3  
1.2800E+05  
0  
0  
0  
1  
0  
Compartment 3:  
RB  
3  
1.3000E+03  
0  
0  
0  
0  
0  
Compartment 4:  
SP  
3  
8.2000E+04  
0  
0  
0  
0  
0  
Compartment 5:  
CR  
1  
2.7500E+04  
0  
0  
0  
0  
0  
Compartment 6:

PSAT 05201H.08

Enviro

2

0.0000E+00

0

0

0

0

0

Compartment 7:

Dummy

3

1.0000E+06

0

0

0

0

0

Compartment 8:

SL

3

32.36

0

0

0

1

0

Pathways:

14

Pathway 1:

DW to WW

1

2

2

Pathway 2:

WW to DW

2

1

2

Pathway 3:

Bypass DW 1 to Dummy

1

7

2

Pathway 4:

DW to RB

1

3

2

Pathway 5:

WW to RB

2

3

2

Pathway 6:

SP to RB

2

3  
 2  
 Pathway 7:  
 Bypass DW 3 to Dummy  
 1  
 7  
 2

Pathway 8:  
 Bypass WW to Enviro  
 2  
 6  
 2

Pathway 9:  
 RB SGTS to Dummy  
 3  
 7  
 2

Pathway 10:  
 Enviro to CR  
 6  
 5  
 2

Pathway 11:  
 CR to Enviro  
 5  
 6  
 2

Pathway 12:  
 Leaking SL to Dummy  
 8  
 7  
 2

Pathway 13:  
 DW to SL  
 1  
 8  
 2

Pathway 14:  
 Bypass DW 2 to Dummy  
 1  
 7  
 2

End of Plant Model File  
 Scenario Description Name:

Plant Model Filename:

Source Term:

1  
 1 1.0000E+00  
 F:\radtrad303\oyster creek 2007\oc60.inp  
 F:\radtrad303\oyster creek 2007\oc.rft  
 0.0000E+00  
 1  
 9.5000E-01 4.8500E-02 1.5000E-03 1.0000E+00  
 Overlying Pool:

0  
0.0000E+00  
0  
0  
0  
0

Compartments:  
8

Compartment 1:

0  
1  
1  
0.0000E+00  
9  
1.6630E-01      25.234E+00  
4.6450E-01      0.2725E+00  
7.0190E-01      43.141E+00  
9.3360E-01      0.3249E+00  
1.1291E+00      26.366E+00  
2.0073E+00      6.2487E+00  
3.7749E+00      6.4500E-02  
4.6334E+00      3.9924E+00  
7.7909E+00      1.9970E-01

1  
0.0000E+00  
9  
1.6630E-01      25.234E+00  
4.6450E-01      0.2725E+00  
7.0190E-01      43.141E+00  
9.3360E-01      0.3249E+00  
1.1291E+00      26.366E+00  
2.0073E+00      6.2487E+00  
3.7749E+00      6.4500E-02  
4.6334E+00      3.9924E+00  
7.7909E+00      1.9970E-01

1  
0.0000E+00  
0  
0  
0  
0  
0

Compartment 2:

0  
1  
0  
0  
0  
0  
0  
1  
5  
1.1290E+00    1.5000E+00  
3.7780E+00    0.0000E+00  
5.2220E+00    1.5000E-01  
7.8440E+00    0.0000E+00

7.2000E+02 0.0000E+00  
1  
5  
1.1290E+00 1.5000E+00  
3.7780E+00 0.0000E+00  
5.2220E+00 1.5000E-01  
7.8440E+00 0.0000E+00  
7.2000E+02 0.0000E+00

Compartment 3:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 4:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 5:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 6:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 7:

0  
1  
0  
0  
0  
0  
0

```

0
0
Compartment 8:
0
1
0
0
0
0
0
1
9
0.0800E-01  1.3604E+00
5.1170E-01  2.5427E+00
1.0089E+00  2.4120E+00
2.2385E+00  2.5895E+00
2.8033E+00  2.1079E+00
3.0875E+00  1.3937E+00
5.0413E+00  0.6557E+00
9.8705E+00  0.3799E+00
2.4000E+01  0.0000E+00
1
9
0.0800E-01  0.0000E+00
5.1170E-01  0.0000E+00
1.0089E+00  0.0000E+00
2.2385E+00  0.0000E+00
2.8033E+00  0.0000E+00
3.0875E+00  0.0000E+00
5.0413E+00  0.0000E+00
9.8705E+00  0.0000E+00
2.4000E+01  0.0000E+00

```

Pathways:

14

Pathway 1:

```

0
0
0
0
0
1
4
1.1290E+00  9.1800E+03  0.0000E+00  0.0000E+00  0.0000E+00
1.2960E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
2.0080E+00  3.0000E+04  0.0000E+00  0.0000E+00  0.0000E+00
7.2000E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0
0
0
0
0
0

```

Pathway 2:

```

0
0
0

```

0				
0				
1				
4				
1.2960E+00	9.1800E+03	0.0000E+00	0.0000E+00	0.0000E+00
1.4630E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
2.0080E+00	3.0000E+04	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0				
0				
0				
0				
0				
0				
0				
Pathway 3:				
0				
0				
0				
0				
0				
1				
2				
0.0000E+00	1.2000E-01	50.000E+00	5.0000E+01	0.0000E+00
2.4000E+01	6.0000E-02	50.000E+00	5.0000E+01	0.0000E+00
0				
0				
0				
0				
0				
0				
Pathway 4:				
0				
0				
0				
0				
0				
1				
2				
0.0000E+00	9.6000E-01	0.0000E+00	0.0000E+00	0.0000E+00
2.4000E+01	4.8000E-01	0.0000E+00	0.0000E+00	0.0000E+00
0				
0				
0				
0				
0				
0				
Pathway 5:				
0				
0				
0				
0				
0				
1				
2				
0.0000E+00	7.6000E-01	0.0000E+00	0.0000E+00	0.0000E+00
2.4000E+01	3.8000E-01	0.0000E+00	0.0000E+00	0.0000E+00

0  
0  
0  
0  
0  
0

Pathway 6:

0  
0  
0  
0  
0

1

2

0.0000E+00	0.1300E+00	9.0000E+01	9.0000E+01	9.0000E+01
7.2000E+02	0.1300E+00	9.0000E+01	9.0000E+01	9.0000E+01

0  
0  
0  
0  
0

Pathway 7:

0  
0  
0  
0  
0

1

2

0.0000E+00	3.0100E-02	9.1600E+01	5.0000E+01	0.0000E+00
2.4000E+01	1.5050E-02	9.1600E+01	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0

Pathway 8:

0  
0  
0  
0  
0

1

2

0.0000E+00	1.3200E-01	9.1600E+01	5.0000E+01	0.0000E+00
2.4000E+01	6.6000E-02	9.1600E+01	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0

Pathway 9:

0

```
0
0
0
0
1
2
0.0000E+00  2.6000E+03  9.0000E+01  9.0000E+01  9.0000E+01
7.2000E+02  2.6000E+03  9.0000E+01  9.0000E+01  9.0000E+01
0
0
0
0
0
0
Pathway 10:
0
0
0
0
0
1
2
0.0000E+00  1.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00
7.2000E+02  1.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00
0
0
0
0
0
0
Pathway 11:
0
0
0
0
0
1
2
0.0000E+00  1.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00
7.2000E+02  1.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00
0
0
0
0
0
0
Pathway 12:
0
0
0
0
0
1
2
0.0000E+00  1.7000E-01  0.0000E+00  5.0000E+01  0.0000E+00
2.4000E+01  8.5000E-02  0.0000E+00  5.0000E+01  0.0000E+00
```

0  
 0  
 0  
 0  
 0  
 0  
 Pathway 13:  
 0  
 0  
 0  
 0  
 0  
 1  
 2  

0.0000E+00	9.5000E-02	0.0000E+00	0.0000E+00	0.0000E+00
2.4000E+01	4.7500E-02	0.0000E+00	0.0000E+00	0.0000E+00

 0  
 0  
 0  
 0  
 0

Pathway 14:  
 0  
 0  
 0  
 0  
 0  
 1  
 2  

0.0000E+00	4.5000E-02	9.6500E+01	5.0000E+01	0.0000E+00
2.4000E+01	2.2500E-02	9.6500E+01	5.0000E+01	0.0000E+00

 0  
 0  
 0  
 0  
 0  
 0

Dose Locations:

3  
 Location 1:  
 CR

5	
0	
1	
2	
0.0080E+00	3.4700E-04
7.2000E+02	3.4700E-04
1	
4	
0.0080E+00	1.0000E+00
2.4000E+01	2.5000E-01
9.6000E+01	2.5000E-01
7.2000E+02	2.5000E-01

Location 2:  
 EAB

6  
 1  
 4  
 0.0000E+00    0.0000E+00  
 1.5000E+00    1.4100E-03  
 3.5000E+00    0.0000E+00  
 7.2000E+02    0.0000E+00

1  
 4  
 0.0080E+00    3.4700E-04  
 8.0000E+00    3.4700E-04  
 2.4000E+01    0.0000E+00  
 7.2000E+02    0.0000E+00

0  
 Location 3:

LPZ

6  
 1  
 7  
 0.0000E+00    6.2300E-05  
 1.5000E+00    1.3500E-04  
 3.5000E+00    6.2300E-05  
 8.0000E+00    4.2300E-05  
 2.4000E+01    1.8200E-05  
 9.6000E+01    5.4300E-06  
 7.2000E+02    0.0000E+00

1  
 4  
 0.0080E+00    3.4700E-04  
 8.0000E+00    1.7500E-04  
 2.4000E+01    2.3200E-04  
 7.2000E+02    2.3200E-04

0  
 Effective Volume Location:

1  
 6  
 0.0000E+00    1.1500E-03  
 8.7000E+00    2.5900E-03  
 1.6700E+01    1.1500E-03  
 2.4000E+01    8.4400E-04  
 9.6000E+01    7.1800E-04  
 7.2000E+02    7.1800E-04

Simulation Parameters:

6  
 0.0000E+00    5.0000E-03  
 4.0000E+00    5.0000E-01  
 8.0000E+00    1.0000E+00  
 2.4000E+01    2.0000E+00  
 4.8000E+01    2.4000E+01  
 7.2000E+02    0.0000E+00

Output Filename:

F:\radtrad303\newrun\2004oc\oc3.o0  
 1  
 1  
 1  
 1

1  
End of Scenario File

**File rev1sl\_env.psf**

```
Radtrad 3.03 4/15/2001
Oyster Creek - Path SL Out
Nuclide Inventory File:
F:\radtrad303\oyster creek 2007\13oc60.nif
Plant Power Level:
  1.9690E+03
Compartments:
  8
Compartment 1:
DW
  3
  1.8000E+05
  1
  0
  0
  0
  0
  0
Compartment 2:
WW
  3
  1.2800E+05
  0
  0
  0
  1
  0
Compartment 3:
RB
  3
  1.3000E+03
  0
  0
  0
  0
  0
  0
Compartment 4:
SP
  3
  8.2000E+04
  0
  0
  0
  0
  0
  0
Compartment 5:
CR
  1
  2.7500E+04
  0
  0
  0
  0
  0
  0
Compartment 6:
```

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Enviro

2

0.0000E+00

0

0

0

0

0

Compartment 7:

Dummy

3

1.0000E+06

0

0

0

0

0

Compartment 8:

SL

3

32.36

0

0

0

1

0

Pathways:

14

Pathway 1:

DW to WW

1

2

2

Pathway 2:

WW to DW

2

1

2

Pathway 3:

Bypass DW 1 to Dummy

1

7

2

Pathway 4:

DW to RB

1

3

2

Pathway 5:

WW to RB

2

3

2

Pathway 6:

SP to RB

2

```

3
2
Pathway 7:
Bypass DW 3 to Dummy
1
7
2
Pathway 8:
Bypass WW to Dummy
2
7
2
Pathway 9:
RB SGTS to Dummy
3
7
2
Pathway 10:
Enviro to CR
6
5
2
Pathway 11:
CR to Enviro
5
6
2
Pathway 12:
Leaking SL to Enviro
8
6
2
Pathway 13:
DW to SL
1
8
2
Pathway 14:
Bypass DW 2 to Dummy
1
7
2
End of Plant Model File
Scenario Description Name:

Plant Model Filename:

Source Term:
1
1 1.0000E+00
F:\radtrad303\oyster creek 2007\oc60.inp
F:\radtrad303\oyster creek 2007\oc.rft
0.0000E+00
1
9.5000E-01 4.8500E-02 1.5000E-03 1.0000E+00
Overlying Pool:

```

```

0
0.0000E+00
0
0
0
0
Compartments:
8
Compartment 1:
0
1
1
0.0000E+00
9
1.6630E-01    25.234E+00
4.6450E-01    0.2725E+00
7.0190E-01    43.141E+00
9.3360E-01    0.3249E+00
1.1291E+00    26.366E+00
2.0073E+00    6.2487E+00
3.7749E+00    6.4500E-02
4.6334E+00    3.9924E+00
7.7909E+00    1.9970E-01
1
0.0000E+00
9
1.6630E-01    25.234E+00
4.6450E-01    0.2725E+00
7.0190E-01    43.141E+00
9.3360E-01    0.3249E+00
1.1291E+00    26.366E+00
2.0073E+00    6.2487E+00
3.7749E+00    6.4500E-02
4.6334E+00    3.9924E+00
7.7909E+00    1.9970E-01
1
0.0000E+00
0
0
0
0
0
0
Compartment 2:
0
1
0
0
0
0
0
0
1
5
1.1290E+00    1.5000E+00
3.7780E+00    0.0000E+00
5.2220E+00    1.5000E-01
7.8440E+00    0.0000E+00

```

7.2000E+02 0.0000E+00  
1  
5  
1.1290E+00 1.5000E+00  
3.7780E+00 0.0000E+00  
5.2220E+00 1.5000E-01  
7.8440E+00 0.0000E+00  
7.2000E+02 0.0000E+00

Compartment 3:

0  
1  
0  
0  
0  
0  
0  
0  
0

Compartment 4:

0  
1  
0  
0  
0  
0  
0  
0  
0

Compartment 5:

0  
1  
0  
0  
0  
0  
0  
0  
0

Compartment 6:

0  
1  
0  
0  
0  
0  
0  
0  
0

Compartment 7:

0  
1  
0  
0  
0  
0  
0

```

0
0
Compartment 8:
0
1
0
0
0
0
0
1
9
0.0800E-01  1.3604E+00
5.1170E-01  2.5427E+00
1.0089E+00  2.4120E+00
2.2385E+00  2.5895E+00
2.8033E+00  2.1079E+00
3.0875E+00  1.3937E+00
5.0413E+00  0.6557E+00
9.8705E+00  0.3799E+00
2.4000E+01  0.0000E+00
1
9
0.0800E-01  0.0000E+00
5.1170E-01  0.0000E+00
1.0089E+00  0.0000E+00
2.2385E+00  0.0000E+00
2.8033E+00  0.0000E+00
3.0875E+00  0.0000E+00
5.0413E+00  0.0000E+00
9.8705E+00  0.0000E+00
2.4000E+01  0.0000E+00

```

Pathways:

14

Pathway 1:

```

0
0
0
0
0
1
4
1.1290E+00  9.1800E+03  0.0000E+00  0.0000E+00  0.0000E+00
1.2960E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
2.0080E+00  3.0000E+04  0.0000E+00  0.0000E+00  0.0000E+00
7.2000E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00

```

Pathway 2:

```

0
0
0

```

```

0
0
1
4
1.2960E+00  9.1800E+03  0.0000E+00  0.0000E+00  0.0000E+00
1.4630E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
2.0080E+00  3.0000E+04  0.0000E+00  0.0000E+00  0.0000E+00
7.2000E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0
0
0
0
0
0
Pathway 3:
0
0
0
0
0
1
2
0.0000E+00  1.2000E-01  50.000E+00  5.0000E+01  0.0000E+00
2.4000E+01  6.0000E-02  50.000E+00  5.0000E+01  0.0000E+00
0
0
0
0
0
0
Pathway 4:
0
0
0
0
0
1
2
0.0000E+00  9.6000E-01  0.0000E+00  0.0000E+00  0.0000E+00
2.4000E+01  4.8000E-01  0.0000E+00  0.0000E+00  0.0000E+00
0
0
0
0
0
0
Pathway 5:
0
0
0
0
0
1
2
0.0000E+00  7.6000E-01  0.0000E+00  0.0000E+00  0.0000E+00
2.4000E+01  3.8000E-01  0.0000E+00  0.0000E+00  0.0000E+00

```

0  
0  
0  
0  
0  
0

Pathway 6:

0  
0  
0  
0  
0

1

2

0.0080E+00	0.1300E+00	1.0000E+02	0.0000E+00	0.0000E+00
7.2000E+02	0.1300E+00	1.0000E+02	0.0000E+00	0.0000E+00

0  
0  
0  
0  
0

Pathway 7:

0  
0  
0  
0  
0

1

2

0.0000E+00	3.0100E-02	9.1600E+01	5.0000E+01	0.0000E+00
2.4000E+01	1.5050E-02	9.1600E+01	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0

Pathway 8:

0  
0  
0  
0  
0

1

2

0.0000E+00	1.3200E-01	9.1600E+01	5.0000E+01	0.0000E+00
2.4000E+01	6.6000E-02	9.1600E+01	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0

Pathway 9:

0

0  
0  
0  
0  
1  
2  
0.0000E+00 2.6000E+03 9.0000E+01 9.0000E+01 9.0000E+01  
7.2000E+02 2.6000E+03 9.0000E+01 9.0000E+01 9.0000E+01  
0  
0  
0  
0  
0  
0

Pathway 10:

0  
0  
0  
0  
0  
1  
2  
0.0000E+00 1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
7.2000E+02 1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
0  
0  
0  
0  
0  
0

Pathway 11:

0  
0  
0  
0  
0  
1  
2  
0.0000E+00 1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
7.2000E+02 1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
0  
0  
0  
0  
0  
0

Pathway 12:

0  
0  
0  
0  
0  
1  
2  
0.0000E+00 1.7000E-01 0.0000E+00 5.0000E+01 0.0000E+00  
1.1000E+01 8.5000E-02 0.0000E+00 5.0000E+01 0.0000E+00

0  
 0  
 0  
 0  
 0  
 0  
 Pathway 13:  
 0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 9.5000E-02 0.0000E+00 0.0000E+00 0.0000E+00  
 2.4000E+01 4.7500E-02 0.0000E+00 0.0000E+00 0.0000E+00  
 0  
 0  
 0  
 0  
 0

Pathway 14:  
 0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 4.5000E-02 9.6500E+01 5.0000E+01 0.0000E+00  
 2.4000E+01 2.2500E-02 9.6500E+01 5.0000E+01 0.0000E+00  
 0  
 0  
 0  
 0  
 0  
 0

Dose Locations:  
 3

Location 1:  
 CR

5  
 0  
 1  
 2  
 0.0080E+00 3.4700E-04  
 7.2000E+02 3.4700E-04  
 1  
 5  
 0.0080E+00 1.0000E+00  
 1.1000E+01 2.5000E-01  
 8.3000E+01 2.5000E-01  
 7.0700E+02 2.5000E-01  
 7.2000E+02 2.5000E-01

Location 2:

EAB

6		
1		
2		
0.0000E+00	0.0000E+00	
7.0700E+02	0.0000E+00	
1		
4		
0.0080E+00	3.4700E-04	
8.0000E+00	3.4700E-04	
2.4000E+01	0.0000E+00	
7.2000E+02	0.0000E+00	
0		

Location 3:

LPZ

6		
1		
4		
0.0000E+00	4.2300E-05	
1.1000E+01	1.8200E-05	
8.3000E+01	5.4300E-06	
7.0700E+02	0.0000E+00	
1		
4		
0.0080E+00	3.4700E-04	
8.0000E+00	1.7500E-04	
2.4000E+01	2.3200E-04	
7.2000E+02	2.3200E-04	
0		

Effective Volume Location:

1		
5		
0.0000E+00	2.7100E-03	
3.7000E+00	8.7600E-04	
1.1000E+01	8.6300E-04	
8.3000E+01	8.4500E-04	
7.0700E+02	8.4500E-04	

Simulation Parameters:

6		
0.0000E+00	5.0000E-03	
4.0000E+00	5.0000E-01	
8.0000E+00	1.0000E+00	
2.4000E+01	2.0000E+00	
4.8000E+01	2.4000E+01	
7.2000E+02	0.0000E+00	

Output Filename:

F:\radtrad303\newrun\2004oc\oc3.c0

1  
1  
1  
1  
1

End of Scenario File

**File rev1rb\_env.psf**

```
Radtrad 3.03 4/15/2001
Oyster Creek - Path SGTS
Nuclide Inventory File:
F:\radtrad303\oyster creek 2007\oc60.nif
Plant Power Level:
  1.9690E+03
Compartments:
  8
Compartment 1:
DW
  3
  1.8000E+05
  1
  0
  0
  0
  0
Compartment 2:
WW
  3
  1.2800E+05
  0
  0
  0
  1
  0
Compartment 3:
RB
  3
  1.3000E+03
  0
  0
  0
  0
  0
Compartment 4:
SP
  3
  8.2000E+04
  0
  0
  0
  0
  0
Compartment 5:
CR
  1
  2.7500E+04
  0
  0
  0
  0
  0
Compartment 6:
```

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Enviro

2  
0.0000E+00  
0  
0  
0  
0  
0

Compartment 7:

Dummy  
3  
1.0000E+06  
0  
0  
0  
0  
0

Compartment 8:

SL  
3  
32.36  
0  
0  
0  
1  
0

Pathways:

14  
Pathway 1:  
DW to WW

1  
2  
2

Pathway 2:  
WW to DW

2  
1  
2

Pathway 3:  
Bypass DW 1 to Dummy

1  
7  
2

Pathway 4:  
DW to RB

1  
3  
2

Pathway 5:  
WW to RB

2  
3  
2

Pathway 6:  
SP to RB

2

3  
 2  
 Pathway 7:  
 Bypass DW 3 to Dummy  
 1  
 7  
 2

Pathway 8:  
 Bypass WW to Dummy  
 2  
 7  
 2

Pathway 9:  
 RB SGTS to Enviro  
 3  
 6  
 2

Pathway 10:  
 Enviro to CR  
 6  
 5  
 2

Pathway 11:  
 CR to Enviro  
 5  
 6  
 2

Pathway 12:  
 Leaking SL to Dummy  
 8  
 7  
 2

Pathway 13:  
 DW to SL  
 1  
 8  
 2

Pathway 14:  
 Bypass DW 2 to Dummy  
 1  
 7  
 2

End of Plant Model File  
 Scenario Description NamF:

Plant Model FileNamF:

Source Term:

1  
 1 1.0000E+00  
 F:\radtrad303\oyster creek 2007\oc60.inp  
 F:\radtrad303\oyster creek 2007\oc.rft  
 0.0000E+00  
 1  
 9.5000E-01 4.8500E-02 1.5000E-03 1.0000E+00  
 Overlying Pool:

```

0
0.0000E+00
0
0
0
0
0
Compartment 1:
8
Compartment 1:
0
1
1
0.0000E+00
9
1.6630E-01      25.234E+00
4.6450E-01      0.2725E+00
7.0190E-01      43.141E+00
9.3360E-01      0.3249E+00
1.1291E+00      26.366E+00
2.0073E+00      6.2487E+00
3.7749E+00      6.4500E-02
4.6334E+00      3.9924E+00
7.7909E+00      1.9970E-01
1
0.0000E+00
9
1.6630E-01      25.234E+00
4.6450E-01      0.2725E+00
7.0190E-01      43.141E+00
9.3360E-01      0.3249E+00
1.1291E+00      26.366E+00
2.0073E+00      6.2487E+00
3.7749E+00      6.4500E-02
4.6334E+00      3.9924E+00
7.7909E+00      1.9970E-01
1
0.0000E+00
0
0
0
0
0
0
0
0
0
Compartment 2:
0
1
0
0
0
0
0
0
1
5
1.1290E+00      1.5000E+00
3.7780E+00      0.0000E+00
5.2220E+00      1.5000E-01
7.8440E+00      0.0000E+00

```

7.2000E+02 0.0000E+00  
1  
5  
1.1290E+00 1.5000E+00  
3.7780E+00 0.0000E+00  
5.2220E+00 1.5000E-01  
7.8440E+00 0.0000E+00  
7.2000E+02 0.0000E+00

Compartment 3:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 4:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 5:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 6:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 7:

0  
1  
0  
0  
0  
0  
0

0  
0  
Compartment 8:  
0  
1  
0  
0  
0  
0  
0  
1  
9  
0.0800E-01 1.3604E+00  
5.1170E-01 2.5427E+00  
1.0089E+00 2.4120E+00  
2.2385E+00 2.5895E+00  
2.8033E+00 2.1079E+00  
3.0875E+00 1.3937E+00  
5.0413E+00 0.6557E+00  
9.8705E+00 0.3799E+00  
2.4000E+01 0.0000E+00  
1  
9  
0.0800E-01 0.0000E+00  
5.1170E-01 0.0000E+00  
1.0089E+00 0.0000E+00  
2.2385E+00 0.0000E+00  
2.8033E+00 0.0000E+00  
3.0875E+00 0.0000E+00  
5.0413E+00 0.0000E+00  
9.8705E+00 0.0000E+00  
2.4000E+01 0.0000E+00

Pathways:

14

Pathway 1:

0  
0  
0  
0  
0  
1  
4  
1.1290E+00 9.1800E+03 0.0000E+00 0.0000E+00 0.0000E+00  
1.2960E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00  
2.0080E+00 3.0000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
7.2000E+02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

0  
0  
0  
0  
0  
0

Pathway 2:

0  
0  
0

0  
 0  
 1  
 4  
 1.2960E+00 9.1800E+03 0.0000E+00 0.0000E+00 0.0000E+00  
 1.4630E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00  
 2.0080E+00 3.0000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
 7.2000E+02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

Pathway 3:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 1.2000E-01 50.000E+00 5.0000E+01 0.0000E+00  
 2.4000E+01 6.0000E-02 50.000E+00 5.0000E+01 0.0000E+00

Pathway 4:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 9.6000E-01 0.0000E+00 0.0000E+00 0.0000E+00  
 2.4000E+01 4.8000E-01 0.0000E+00 0.0000E+00 0.0000E+00

Pathway 5:

0  
 0  
 0  
 0  
 0  
 1  
 2  
 0.0000E+00 7.6000E-01 0.0000E+00 0.0000E+00 0.0000E+00  
 2.4000E+01 3.8000E-01 0.0000E+00 0.0000E+00 0.0000E+00

0  
0  
0  
0  
0  
0

Pathway 6:

0  
0  
0  
0  
0

1

2

0.0000E+00	0.1300E+00	9.0000E+01	9.0000E+01	9.0000E+01
7.2000E+02	0.1300E+00	9.0000E+01	9.0000E+01	9.0000E+01

0  
0  
0  
0  
0

Pathway 7:

0  
0  
0  
0  
0

1

2

0.0000E+00	3.0100E-02	9.1600E+01	5.0000E+01	0.0000E+00
2.4000E+01	1.5050E-02	9.1600E+01	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0

Pathway 8:

0  
0  
0  
0  
0

1

2

0.0000E+00	1.3200E-01	9.1600E+01	5.0000E+01	0.0000E+00
2.4000E+01	6.6000E-02	9.1600E+01	5.0000E+01	0.0000E+00

0  
0  
0  
0  
0

Pathway 9:

0

```

0
0
0
0
1
2
0.0000E+00  2.6000E+03  9.0000E+01  9.0000E+01  9.0000E+01
7.2000E+02  2.6000E+03  9.0000E+01  9.0000E+01  9.0000E+01
0
0
0
0
0
0
Pathway 10:
0
0
0
0
0
1
2
0.0000E+00  1.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00
7.2000E+02  1.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00
0
0
0
0
0
0
Pathway 11:
0
0
0
0
0
1
2
0.0000E+00  1.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00
7.2000E+02  1.4000E+04  0.0000E+00  0.0000E+00  0.0000E+00
0
0
0
0
0
0
Pathway 12:
0
0
0
0
0
1
2
0.0000E+00  1.7000E-01  0.0000E+00  5.0000E+01  0.0000E+00
2.4000E+01  8.5000E-02  0.0000E+00  5.0000E+01  0.0000E+00

```

0  
 0  
 0  
 0  
 0  
 0  
 Pathway 13:  
 0  
 0  
 0  
 0  
 0  
 1  
 2  

0.0000E+00	9.5000E-02	0.0000E+00	0.0000E+00	0.0000E+00
2.4000E+01	4.7500E-02	0.0000E+00	0.0000E+00	0.0000E+00

0  
 0  
 0  
 0  
 0

Pathway 14:  
 0  
 0  
 0  
 0  
 0  
 1  
 2  

0.0000E+00	4.5000E-02	9.6500E+01	5.0000E+01	0.0000E+00
2.4000E+01	2.2500E-02	9.6500E+01	5.0000E+01	0.0000E+00

0  
 0  
 0  
 0  
 0

Dose Locations:  
 3

Location 1:  
 CR  
 5  
 0  
 1  
 2  

0.0080E+00	3.4700E-04
7.2000E+02	3.4700E-04

 1  
 4  

0.0080E+00	1.0000E+00
2.4000E+01	2.5000E-01
9.6000E+01	2.5000E-01
7.2000E+02	2.5000E-01

Location 2:  
 EAB

6  
 1  
 4  
 0.0000E+00    0.0000E+00  
 1.5000E+00    1.0700E-04  
 3.5000E+00    0.0000E+00  
 7.2000E+02    0.0000E+00

1  
 4  
 0.0080E+00    3.4700E-04  
 8.0000E+00    3.4700E-04  
 2.4000E+01    0.0000E+00  
 7.2000E+02    0.0000E+00

0  
 Location 3:

LPZ

6  
 1  
 8  
 0.0000E+00    1.6800E-05  
 4.0000E+00    8.8800E-07  
 8.0000E+00    6.1900E-07  
 8.7000E+00    6.1900E-07  
 1.6700E+01    6.1900E-07  
 2.4000E+01    2.8300E-07  
 9.6000E+01    9.1600E-08  
 7.2000E+02    0.0000E+00

1  
 4  
 0.0080E+00    3.4700E-04  
 8.0000E+00    1.7500E-04  
 2.4000E+01    2.3200E-04  
 7.2000E+02    2.3200E-04  
 0

Effective Volume Location:

1  
 6  
 0.0000E+00    9.6700E-05  
 8.7000E+00    1.8000E-04  
 1.6700E+01    9.6700E-05  
 2.4000E+01    2.5000E-05  
 9.6000E+01    3.6000E-06  
 7.2000E+02    3.6000E-06

Simulation Parameters:

6  
 0.0000E+00    5.0000E-03  
 4.0000E+00    5.0000E-01  
 8.0000E+00    1.0000E+00  
 2.4000E+01    2.0000E+00  
 4.8000E+01    2.4000E+01  
 7.2000E+02    0.0000E+00

Output Filename:

F:\radtrad303\newrun\2004oc\oc3.o0

1  
 1  
 1

1  
1  
End of Scenario File

**File rev1esf\_env.psf**

```
Radtrad 3.03 4/15/2001
Oyster Creek - Path SGTS(ESF Leakage)
Nuclide Inventory File:
F:\radtrad303\oyster creek 2007\ocesf.nif
Plant Power Level:
  1.9690E+03
Compartments:
  8
Compartment 1:
DW
  3
  1.8000E+05
  1
  0
  0
  0
  0
Compartment 2:
WW
  3
  1.2800E+05
  0
  0
  0
  1
  0
Compartment 3:
RB
  3
  1.3000E+03
  0
  0
  0
  0
  0
Compartment 4:
SP
  3
  8.2000E+04
  0
  0
  0
  0
  0
Compartment 5:
CR
  1
  2.7500E+04
  0
  0
  0
  0
  0
Compartment 6:
```

PSAT 05201H.08

Enviro

2

0.0000E+00

0

0

0

0

0

Compartment 7:

Dummy

3

1.0000E+06

0

0

0

0

0

Compartment 8:

SL

3

32.36

0

0

0

1

0

Pathways:

14

Pathway 1:

DW to WW

1

2

2

Pathway 2:

WW to DW

2

1

2

Pathway 3:

Bypass DW 1 to Dummy

1

7

2

Pathway 4:

DW to RB

1

3

2

Pathway 5:

WW to RB

2

3

2

Pathway 6:

SP to RB

4

```

3
2
Pathway 7:
Bypass DW 3 to Dummy
1
7
2
Pathway 8:
Bypass WW to Dummy
2
7
2
Pathway 9:
RB SGTS to Enviro
3
6
2
Pathway 10:
Enviro to CR
6
5
2
Pathway 11:
CR to Enviro
5
6
2
Pathway 12:
Leaking SL to Dummy
8
7
2
Pathway 13:
DW to SL
1
8
2
Pathway 14:
Bypass DW 2 to Dummy
1
7
2
End of Plant Model File
Scenario Description Name:

Plant Model Filename:

Source Term:
2
1 0.0000E+00
4 1.0000E+00
F:\radtrad303\oyster creek 2007\oc60.inp
F:\radtrad303\oyster creek 2007\oc.rft
0.0000E+00
1
9.5000E-01 4.8500E-02 1.5000E-03 1.0000E+00

```

Overlying Pool:

0  
 0.0000E+00  
 0  
 0  
 0  
 0

Compartments:

8

Compartment 1:

0  
 1  
 1  
 0.0000E+00  
 9  
 1.6630E-01      25.234E+00  
 4.6450E-01      0.2725E+00  
 7.0190E-01      43.141E+00  
 9.3360E-01      0.3249E+00  
 1.1291E+00      26.366E+00  
 2.0073E+00      6.2487E+00  
 3.7749E+00      6.4500E-02  
 4.6334E+00      3.9924E+00  
 7.7909E+00      1.9970E-01

1  
 0.0000E+00  
 9  
 1.6630E-01      25.234E+00  
 4.6450E-01      0.2725E+00  
 7.0190E-01      43.141E+00  
 9.3360E-01      0.3249E+00  
 1.1291E+00      26.366E+00  
 2.0073E+00      6.2487E+00  
 3.7749E+00      6.4500E-02  
 4.6334E+00      3.9924E+00  
 7.7909E+00      1.9970E-01

1  
 0.0000E+00  
 0  
 0  
 0  
 0  
 0

Compartment 2:

0  
 1  
 0  
 0  
 0  
 0  
 0  
 1  
 5  
 1.1290E+00    1.5000E+00  
 3.7780E+00    0.0000E+00  
 5.2220E+00    1.5000E-01

7.8440E+00 0.0000E+00  
7.2000E+02 0.0000E+00  
1  
5  
1.1290E+00 1.5000E+00  
3.7780E+00 0.0000E+00  
5.2220E+00 1.5000E-01  
7.8440E+00 0.0000E+00  
7.2000E+02 0.0000E+00

Compartment 3:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 4:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 5:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 6:

0  
1  
0  
0  
0  
0  
0  
0  
0  
0

Compartment 7:

0  
1  
0  
0  
0  
0

```

0
0
0
Compartment 8:
0
1
0
0
0
0
0
1
9
0.0800E-01  1.3604E+00
5.1170E-01  2.5427E+00
1.0089E+00  2.4120E+00
2.2385E+00  2.5895E+00
2.8033E+00  2.1079E+00
3.0875E+00  1.3937E+00
5.0413E+00  0.6557E+00
9.8705E+00  0.3799E+00
2.4000E+01  0.0000E+00
1
9
0.0800E-01  0.0000E+00
5.1170E-01  0.0000E+00
1.0089E+00  0.0000E+00
2.2385E+00  0.0000E+00
2.8033E+00  0.0000E+00
3.0875E+00  0.0000E+00
5.0413E+00  0.0000E+00
9.8705E+00  0.0000E+00
2.4000E+01  0.0000E+00

```

Pathways:

14

Pathway 1:

```

0
0
0
0
0
1
4
1.1290E+00  9.1800E+03  0.0000E+00  0.0000E+00  0.0000E+00
1.2960E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
2.0080E+00  3.0000E+04  0.0000E+00  0.0000E+00  0.0000E+00
7.2000E+02  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
0
0
0
0
0
0

```

Pathway 2:

```

0
0

```

0  
0  
0  
1  
4  
0  
0  
0  
0  
0  
0  
0  
0  
0

1.2960E+00	9.1800E+03	0.0000E+00	0.0000E+00	0.0000E+00
1.4630E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
2.0080E+00	3.0000E+04	0.0000E+00	0.0000E+00	0.0000E+00
7.2000E+02	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Pathway 3:

0  
0  
0  
0  
0  
1  
2  
0  
0  
0  
0  
0  
0  
0  
0

0.0000E+00	1.2000E-01	50.000E+00	5.0000E+01	0.0000E+00
2.4000E+01	6.0000E-02	50.000E+00	5.0000E+01	0.0000E+00

Pathway 4:

0  
0  
0  
0  
0  
1  
2  
0  
0  
0  
0  
0  
0  
0

0.0000E+00	9.6000E-01	0.0000E+00	0.0000E+00	0.0000E+00
2.4000E+01	4.8000E-01	0.0000E+00	0.0000E+00	0.0000E+00

Pathway 5:

0  
0  
0  
0  
0  
1  
2  
0  
0  
0  
0

0.0000E+00	7.6000E-01	0.0000E+00	0.0000E+00	0.0000E+00
------------	------------	------------	------------	------------

2.4000E+01 3.8000E-01 0.0000E+00 0.0000E+00 0.0000E+00

0  
0  
0  
0  
0  
0

Pathway 6:

0  
0  
0  
0  
0  
1  
2

0.0000E+00 0.1300E+00 1.0000E+02 0.0000E+00 0.0000E+00  
7.2000E+02 0.1300E+00 1.0000E+02 0.0000E+00 0.0000E+00

0  
0  
0  
0  
0

Pathway 7:

0  
0  
0  
0  
0  
1  
2

0.0000E+00 3.0100E-02 9.1600E+01 5.0000E+01 0.0000E+00  
2.4000E+01 1.5050E-02 9.1600E+01 5.0000E+01 0.0000E+00

0  
0  
0  
0  
0

Pathway 8:

0  
0  
0  
0  
0  
1  
2

0.0000E+00 1.3200E-01 9.1600E+01 5.0000E+01 0.0000E+00  
2.4000E+01 6.6000E-02 9.1600E+01 5.0000E+01 0.0000E+00

0  
0  
0  
0  
0

Pathway 9:

0  
0  
0  
0  
0  
1  
2  
0.0000E+00  
7.2000E+02  
0  
0  
0  
0  
0  
0

Pathway 10:

0  
0  
0  
0  
0  
1  
2  
0.0000E+00  
7.2000E+02  
0  
0  
0  
0  
0  
0

2.6000E+03 9.0000E+01 9.0000E+01 9.0000E+01  
2.6000E+03 9.0000E+01 9.0000E+01 9.0000E+01

1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00

Pathway 11:

0  
0  
0  
0  
0  
1  
2  
0.0000E+00  
7.2000E+02  
0  
0  
0  
0  
0  
0

1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00  
1.4000E+04 0.0000E+00 0.0000E+00 0.0000E+00

Pathway 12:

0  
0  
0  
0  
0  
1  
2  
0.0000E+00

1.7000E-01 0.0000E+00 5.0000E+01 0.0000E+00

2.4000E+01	8.5000E-02	0.0000E+00	5.0000E+01	0.0000E+00
0				
0				
0				
0				
0				
0				

Pathway 13:

0				
0				
0				
0				
0				
1				
2				
0.0000E+00	9.5000E-02	0.0000E+00	0.0000E+00	0.0000E+00
2.4000E+01	4.7500E-02	0.0000E+00	0.0000E+00	0.0000E+00
0				
0				
0				
0				
0				

Pathway 14:

0				
0				
0				
0				
0				
1				
2				
0.0000E+00	4.5000E-02	9.6500E+01	5.0000E+01	0.0000E+00
2.4000E+01	2.2500E-02	9.6500E+01	5.0000E+01	0.0000E+00
0				
0				
0				
0				
0				

Dose Locations:

3

Location 1:

CR

5		
0		
1		
2		
0.0080E+00	3.4700E-04	
7.2000E+02	3.4700E-04	
1		
4		
0.0080E+00	1.0000E+00	
2.4000E+01	2.5000E-01	
9.6000E+01	2.5000E-01	
7.2000E+02	2.5000E-01	

Location 2:

EAB

6

1

4

0.0000E+00	0.0000E+00
1.5000E+00	1.0700E-04
3.5000E+00	0.0000E+00
7.2000E+02	0.0000E+00

1

4

0.0080E+00	3.4700E-04
8.0000E+00	3.4700E-04
2.4000E+01	0.0000E+00
7.2000E+02	0.0000E+00

0

Location 3:

LPZ

6

1

8

0.0000E+00	1.6800E-05
4.0000E+00	8.8800E-07
8.0000E+00	6.1900E-07
8.7000E+00	6.1900E-07
1.6700E+01	6.1900E-07
2.4000E+01	2.8300E-07
9.6000E+01	9.1600E-08
7.2000E+02	0.0000E+00

1

4

0.0080E+00	3.4700E-04
8.0000E+00	1.7500E-04
2.4000E+01	2.3200E-04
7.2000E+02	2.3200E-04

0

Effective Volume Location:

1

6

0.0000E+00	9.6700E-05
8.7000E+00	1.8000E-04
1.6700E+01	9.6700E-05
2.4000E+01	2.5000E-05
9.6000E+01	3.6000E-06
7.2000E+02	3.6000E-06

Simulation Parameters:

6

0.0000E+00	5.0000E-03
4.0000E+00	5.0000E-01
8.0000E+00	1.0000E+00
2.4000E+01	2.0000E+00
4.8000E+01	2.4000E+01
7.2000E+02	0.0000E+00

Output Filename:

F:\radtrad303\newrun\2004oc\oc3.o0

1

1

1

1

1

End of Scenario File

## Appendix C5. Oyster Creek RADTRAD output (.out) files (excerpts)

## File rev1dw1\_env.out

## Cumulative Dose Summary

Time (hr)	CR		EAB		LPZ	
	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)
0.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.008	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.166	1.0761E+00	4.9507E-02	0.0000E+00	0.0000E+00	2.5019E-02	1.2184E-03
0.420	3.3335E+00	1.5320E-01	0.0000E+00	0.0000E+00	5.4758E-02	2.7037E-03
0.465	3.5674E+00	1.6390E-01	0.0000E+00	0.0000E+00	5.8380E-02	2.8913E-03
0.508	3.8337E+00	1.7609E-01	0.0000E+00	0.0000E+00	6.3774E-02	3.1656E-03
0.512	3.8627E+00	1.7742E-01	0.0000E+00	0.0000E+00	6.4413E-02	3.1980E-03
0.702	8.7101E+00	4.4323E-01	0.0000E+00	0.0000E+00	1.5903E-01	8.8423E-03
0.934	1.2347E+01	6.5404E-01	0.0000E+00	0.0000E+00	1.9569E-01	1.1458E-02
1.009	1.3059E+01	6.9654E-01	0.0000E+00	0.0000E+00	2.1183E-01	1.2636E-02
1.129	1.6390E+01	8.9774E-01	0.0000E+00	0.0000E+00	2.7645E-01	1.7010E-02
1.129	1.6394E+01	8.9798E-01	0.0000E+00	0.0000E+00	2.7652E-01	1.7015E-02
1.296	2.0038E+01	1.1178E+00	0.0000E+00	0.0000E+00	3.1771E-01	2.0012E-02
1.463	2.1590E+01	1.2105E+00	0.0000E+00	0.0000E+00	3.4196E-01	2.2004E-02
1.715	2.3894E+01	1.3473E+00	0.0000E+00	0.0000E+00	3.7775E-01	2.5209E-02
1.965	2.6177E+01	1.4823E+00	0.0000E+00	0.0000E+00	4.1346E-01	2.8607E-02
2.007	2.6567E+01	1.5052E+00	0.0000E+00	0.0000E+00	4.1956E-01	2.9205E-02
2.008	2.6573E+01	1.5056E+00	0.0000E+00	0.0000E+00	4.1966E-01	2.9215E-02
2.239	2.7783E+01	1.5759E+00	0.0000E+00	0.0000E+00	4.3528E-01	3.1019E-02
2.490	2.8284E+01	1.6032E+00	0.0000E+00	0.0000E+00	4.4237E-01	3.2250E-02
2.740	2.8565E+01	1.6170E+00	0.0000E+00	0.0000E+00	4.4652E-01	3.3265E-02
2.803	2.8621E+01	1.6196E+00	0.0000E+00	0.0000E+00	4.4736E-01	3.3505E-02
3.055	2.8816E+01	1.6281E+00	0.0000E+00	0.0000E+00	4.5034E-01	3.4422E-02
3.087	2.8840E+01	1.6291E+00	0.0000E+00	0.0000E+00	4.5069E-01	3.4537E-02
3.340	2.9011E+01	1.6361E+00	0.0000E+00	0.0000E+00	4.5335E-01	3.5411E-02
3.590	2.9174E+01	1.6426E+00	0.0000E+00	0.0000E+00	4.5588E-01	3.6251E-02
3.775	2.9292E+01	1.6472E+00	0.0000E+00	0.0000E+00	4.5773E-01	3.6857E-02
3.778	2.9294E+01	1.6473E+00	0.0000E+00	0.0000E+00	4.5776E-01	3.6868E-02
4.200	2.9562E+01	1.6577E+00	0.0000E+00	0.0000E+00	4.6193E-01	3.8215E-02
4.500	2.9750E+01	1.6651E+00	0.0000E+00	0.0000E+00	4.6487E-01	3.9144E-02
4.633	2.9834E+01	1.6683E+00	0.0000E+00	0.0000E+00	4.6618E-01	3.9549E-02
5.000	3.0063E+01	1.6771E+00	0.0000E+00	0.0000E+00	4.6976E-01	4.0639E-02
5.041	3.0089E+01	1.6781E+00	0.0000E+00	0.0000E+00	4.7016E-01	4.0759E-02
5.222	3.0202E+01	1.6824E+00	0.0000E+00	0.0000E+00	4.7192E-01	4.1282E-02
5.500	3.0375E+01	1.6889E+00	0.0000E+00	0.0000E+00	4.7462E-01	4.2071E-02
5.800	3.0560E+01	1.6960E+00	0.0000E+00	0.0000E+00	4.7752E-01	4.2903E-02
6.100	3.0746E+01	1.7030E+00	0.0000E+00	0.0000E+00	4.8041E-01	4.3716E-02
6.400	3.0930E+01	1.7099E+00	0.0000E+00	0.0000E+00	4.8329E-01	4.4509E-02
6.700	3.1114E+01	1.7168E+00	0.0000E+00	0.0000E+00	4.8616E-01	4.5285E-02
7.000	3.1298E+01	1.7236E+00	0.0000E+00	0.0000E+00	4.8903E-01	4.6043E-02
7.300	3.1481E+01	1.7304E+00	0.0000E+00	0.0000E+00	4.9188E-01	4.6785E-02
7.600	3.1663E+01	1.7372E+00	0.0000E+00	0.0000E+00	4.9473E-01	4.7511E-02
7.791	3.1779E+01	1.7414E+00	0.0000E+00	0.0000E+00	4.9653E-01	4.7965E-02
7.844	3.1811E+01	1.7426E+00	0.0000E+00	0.0000E+00	4.9703E-01	4.8090E-02
8.000	3.1905E+01	1.7461E+00	0.0000E+00	0.0000E+00	4.9851E-01	4.8455E-02
8.300	3.1986E+01	1.7490E+00	0.0000E+00	0.0000E+00	4.9993E-01	4.9104E-02
8.600	3.2044E+01	1.7512E+00	0.0000E+00	0.0000E+00	5.0135E-01	4.9739E-02
8.900	3.2102E+01	1.7533E+00	0.0000E+00	0.0000E+00	5.0277E-01	5.0360E-02

9.200	3.2160E+01	1.7554E+00	0.0000E+00	0.0000E+00	5.0418E-01	5.0970E-02
9.500	3.2218E+01	1.7575E+00	0.0000E+00	0.0000E+00	5.0558E-01	5.1567E-02
9.800	3.2276E+01	1.7596E+00	0.0000E+00	0.0000E+00	5.0699E-01	5.2152E-02
9.871	3.2289E+01	1.7601E+00	0.0000E+00	0.0000E+00	5.0732E-01	5.2288E-02
10.200	3.2352E+01	1.7623E+00	0.0000E+00	0.0000E+00	5.0885E-01	5.2915E-02
15.300	3.3305E+01	1.7960E+00	0.0000E+00	0.0000E+00	5.3205E-01	6.1323E-02
24.000	3.3502E+01	1.8027E+00	0.0000E+00	0.0000E+00	5.4009E-01	6.3595E-02
87.300	3.4605E+01	1.8387E+00	0.0000E+00	0.0000E+00	6.0233E-01	7.2516E-02
711.300	3.7986E+01	1.9458E+00	0.0000E+00	0.0000E+00	6.6042E-01	7.8252E-02
720.000	3.7997E+01	1.9462E+00	0.0000E+00	0.0000E+00	6.6042E-01	7.8252E-02

## File rev1dw2\_env.out

## Cumulative Dose Summary

Time (hr)	CR		EAB		LPZ	
	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)
0.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.008	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.166	1.7125E-02	6.8346E-04	0.0000E+00	0.0000E+00	1.8142E-03	1.1846E-04
0.420	5.5139E-02	2.2178E-03	0.0000E+00	0.0000E+00	4.1549E-03	3.6974E-04
0.465	5.9582E-02	2.3997E-03	0.0000E+00	0.0000E+00	4.4736E-03	4.1921E-04
0.508	6.4597E-02	2.6045E-03	0.0000E+00	0.0000E+00	4.9223E-03	4.7621E-04
0.512	6.5126E-02	2.6260E-03	0.0000E+00	0.0000E+00	4.9735E-03	4.8182E-04
0.702	1.4488E-01	5.9926E-03	0.0000E+00	0.0000E+00	1.1996E-02	1.1679E-03
0.934	2.1054E-01	8.9581E-03	0.0000E+00	0.0000E+00	1.5303E-02	2.2284E-03
1.009	2.2551E-01	9.6858E-03	0.0000E+00	0.0000E+00	1.6730E-02	2.6871E-03
1.129	2.8372E-01	1.2333E-02	0.0000E+00	0.0000E+00	2.1767E-02	3.6370E-03
1.129	2.8378E-01	1.2336E-02	0.0000E+00	0.0000E+00	2.1772E-02	3.6379E-03
1.296	3.4955E-01	1.5374E-02	0.0000E+00	0.0000E+00	2.5332E-02	4.7293E-03
1.463	3.8348E-01	1.7061E-02	0.0000E+00	0.0000E+00	2.7795E-02	5.8787E-03
1.500	3.9160E-01	1.7473E-02	0.0000E+00	0.0000E+00	2.8377E-02	6.1827E-03
1.750	4.4817E-01	2.0384E-02	9.1896E-02	5.1567E-02	3.7176E-02	1.1120E-02
2.000	5.0946E-01	2.3575E-02	1.9165E-01	1.1133E-01	4.6727E-02	1.6842E-02
2.007	5.1133E-01	2.3672E-02	1.9469E-01	1.1319E-01	4.7017E-02	1.7020E-02
2.008	5.1150E-01	2.3681E-02	1.9498E-01	1.1337E-01	4.7045E-02	1.7037E-02
2.239	5.5062E-01	2.5767E-02	2.5086E-01	1.5346E-01	5.2395E-02	2.0876E-02
2.490	5.7763E-01	2.7268E-02	2.9318E-01	1.9041E-01	5.6448E-02	2.4413E-02
2.740	6.0110E-01	2.8582E-02	3.3057E-01	2.2483E-01	6.0027E-02	2.7709E-02
2.803	6.0681E-01	2.8900E-02	3.3969E-01	2.3323E-01	6.0901E-02	2.8513E-02
3.055	6.2900E-01	3.0122E-02	3.7530E-01	2.6545E-01	6.4311E-02	3.1598E-02
3.087	6.3183E-01	3.0277E-02	3.7985E-01	2.6948E-01	6.4746E-02	3.1984E-02
3.340	6.5364E-01	3.1452E-02	4.1493E-01	2.9982E-01	6.8104E-02	3.4889E-02
3.500	6.6736E-01	3.2179E-02	4.3700E-01	3.1822E-01	7.0217E-02	3.6651E-02
3.750	6.8869E-01	3.3291E-02	4.3700E-01	3.1822E-01	7.1734E-02	3.7867E-02
3.775	6.9081E-01	3.3400E-02	4.3700E-01	3.1822E-01	7.1885E-02	3.7985E-02
3.778	6.9108E-01	3.3413E-02	4.3700E-01	3.1822E-01	7.1904E-02	3.8000E-02
4.200	7.2687E-01	3.5229E-02	4.3700E-01	3.1822E-01	7.4449E-02	3.9914E-02
4.500	7.5218E-01	3.6481E-02	4.3700E-01	3.1822E-01	7.6249E-02	4.1187E-02
4.633	7.6340E-01	3.7028E-02	4.3700E-01	3.1822E-01	7.7047E-02	4.1728E-02
5.000	7.9412E-01	3.8499E-02	4.3700E-01	3.1822E-01	7.9232E-02	4.3147E-02
5.041	7.9757E-01	3.8662E-02	4.3700E-01	3.1822E-01	7.9477E-02	4.3300E-02
5.222	8.1265E-01	3.9370E-02	4.3700E-01	3.1822E-01	8.0549E-02	4.3959E-02
5.500	8.3577E-01	4.0440E-02	4.3700E-01	3.1822E-01	8.2194E-02	4.4931E-02
5.800	8.6062E-01	4.1572E-02	4.3700E-01	3.1822E-01	8.3961E-02	4.5927E-02
6.100	8.8537E-01	4.2681E-02	4.3700E-01	3.1822E-01	8.5721E-02	4.6871E-02
6.400	9.1002E-01	4.3768E-02	4.3700E-01	3.1822E-01	8.7474E-02	4.7767E-02
6.700	9.3458E-01	4.4835E-02	4.3700E-01	3.1822E-01	8.9221E-02	4.8618E-02
7.000	9.5903E-01	4.5883E-02	4.3700E-01	3.1822E-01	9.0960E-02	4.9428E-02
7.300	9.8340E-01	4.6913E-02	4.3700E-01	3.1822E-01	9.2693E-02	5.0200E-02
7.600	1.0077E+00	4.7927E-02	4.3700E-01	3.1822E-01	9.4419E-02	5.0936E-02
7.791	1.0231E+00	4.8564E-02	4.3700E-01	3.1822E-01	9.5513E-02	5.1387E-02
7.844	1.0273E+00	4.8740E-02	4.3700E-01	3.1822E-01	9.5817E-02	5.1510E-02
8.000	1.0399E+00	4.9254E-02	4.3700E-01	3.1822E-01	9.6709E-02	5.1865E-02
8.300	1.0639E+00	5.0232E-02	4.3700E-01	3.1822E-01	9.7295E-02	5.2297E-02
8.600	1.0879E+00	5.1197E-02	4.3700E-01	3.1822E-01	9.7879E-02	5.2709E-02

8.700	1.0959E+00	5.1516E-02	4.3700E-01	3.1822E-01	9.8073E-02	5.2842E-02
9.000	1.1605E+00	5.4082E-02	4.3700E-01	3.1822E-01	9.8654E-02	5.3231E-02
9.300	1.2340E+00	5.6977E-02	4.3700E-01	3.1822E-01	9.9232E-02	5.3603E-02
9.600	1.3072E+00	5.9836E-02	4.3700E-01	3.1822E-01	9.9809E-02	5.3960E-02
9.871	1.3731E+00	6.2385E-02	4.3700E-01	3.1822E-01	1.0033E-01	5.4269E-02
10.200	1.4529E+00	6.5455E-02	4.3700E-01	3.1822E-01	1.0096E-01	5.4631E-02
16.700	2.9743E+00	1.2071E-01	4.3700E-01	3.1822E-01	1.1293E-01	5.9732E-02
24.000	3.5134E+00	1.3913E-01	4.3700E-01	3.1822E-01	1.2550E-01	6.3179E-02
96.000	4.0018E+00	1.5501E-01	4.3700E-01	3.1822E-01	1.5281E-01	6.6897E-02
720.000	5.2685E+00	1.9508E-01	4.3700E-01	3.1822E-01	1.7457E-01	6.8988E-02

File rev1dw3\_env.out

Time (hr)	Cumulative Dose Summary					
	CR		EAB		LPZ	
	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)
0.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.008	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.166	2.6968E-02	1.1392E-03	0.0000E+00	0.0000E+00	2.1762E-03	1.2717E-04
0.420	8.5174E-02	3.6166E-03	0.0000E+00	0.0000E+00	4.8728E-03	3.5178E-04
0.465	9.1599E-02	3.8914E-03	0.0000E+00	0.0000E+00	5.2212E-03	3.9161E-04
0.508	9.8880E-02	4.2024E-03	0.0000E+00	0.0000E+00	5.7246E-03	4.3986E-04
0.512	9.9659E-02	4.2356E-03	0.0000E+00	0.0000E+00	5.7831E-03	4.4481E-04
0.702	2.2305E-01	9.7719E-03	0.0000E+00	0.0000E+00	1.4100E-02	1.0943E-03
0.934	3.2017E-01	1.4326E-02	0.0000E+00	0.0000E+00	1.7672E-02	1.8763E-03
1.009	3.4084E-01	1.5342E-02	0.0000E+00	0.0000E+00	1.9227E-02	2.2154E-03
1.129	4.2823E-01	1.9486E-02	0.0000E+00	0.0000E+00	2.5046E-02	2.9825E-03
1.129	4.2833E-01	1.9490E-02	0.0000E+00	0.0000E+00	2.5052E-02	2.9833E-03
1.296	5.2555E-01	2.4138E-02	0.0000E+00	0.0000E+00	2.8970E-02	3.7957E-03
1.463	5.7159E-01	2.6436E-02	0.0000E+00	0.0000E+00	3.1495E-02	4.6116E-03
1.500	5.8232E-01	2.6977E-02	0.0000E+00	0.0000E+00	3.2076E-02	4.8252E-03
1.750	6.5515E-01	3.0697E-02	8.9700E-02	3.6003E-02	4.0664E-02	8.2723E-03
2.000	7.3184E-01	3.4649E-02	1.8447E-01	7.7479E-02	4.9738E-02	1.2243E-02
2.007	7.3415E-01	3.4768E-02	1.8731E-01	7.8765E-02	5.0010E-02	1.2367E-02
2.008	7.3437E-01	3.4779E-02	1.8759E-01	7.8889E-02	5.0036E-02	1.2378E-02
2.239	7.8018E-01	3.7187E-02	2.3633E-01	1.0631E-01	5.4703E-02	1.5004E-02
2.490	8.0764E-01	3.8694E-02	2.6860E-01	1.3123E-01	5.7793E-02	1.7390E-02
2.740	8.2959E-01	3.9915E-02	2.9503E-01	1.5434E-01	6.0323E-02	1.9602E-02
2.803	8.3476E-01	4.0202E-02	3.0132E-01	1.5996E-01	6.0925E-02	2.0141E-02
3.055	8.5463E-01	4.1295E-02	3.2554E-01	1.8153E-01	6.3244E-02	2.2206E-02
3.087	8.5714E-01	4.1432E-02	3.2860E-01	1.8423E-01	6.3538E-02	2.2464E-02
3.340	8.7641E-01	4.2470E-02	3.5219E-01	2.0454E-01	6.5796E-02	2.4409E-02
3.500	8.8849E-01	4.3110E-02	3.6699E-01	2.1684E-01	6.7213E-02	2.5587E-02
3.750	9.0725E-01	4.4087E-02	3.6699E-01	2.1684E-01	6.8229E-02	2.6401E-02
3.775	9.0911E-01	4.4183E-02	3.6699E-01	2.1684E-01	6.8330E-02	2.6479E-02
3.778	9.0934E-01	4.4195E-02	3.6699E-01	2.1684E-01	6.8342E-02	2.6489E-02
4.200	9.4078E-01	4.5790E-02	3.6699E-01	2.1684E-01	7.0045E-02	2.7770E-02
4.500	9.6301E-01	4.6890E-02	3.6699E-01	2.1684E-01	7.1250E-02	2.8621E-02
4.633	9.7286E-01	4.7369E-02	3.6699E-01	2.1684E-01	7.1783E-02	2.8983E-02
5.000	9.9984E-01	4.8662E-02	3.6699E-01	2.1684E-01	7.3245E-02	2.9932E-02
5.041	1.0029E+00	4.8805E-02	3.6699E-01	2.1684E-01	7.3409E-02	3.0035E-02
5.222	1.0161E+00	4.9426E-02	3.6699E-01	2.1684E-01	7.4126E-02	3.0475E-02
5.500	1.0364E+00	5.0366E-02	3.6699E-01	2.1684E-01	7.5226E-02	3.1125E-02
5.800	1.0582E+00	5.1360E-02	3.6699E-01	2.1684E-01	7.6408E-02	3.1791E-02
6.100	1.0800E+00	5.2334E-02	3.6699E-01	2.1684E-01	7.7586E-02	3.2423E-02
6.400	1.1016E+00	5.3288E-02	3.6699E-01	2.1684E-01	7.8758E-02	3.3022E-02
6.700	1.1232E+00	5.4225E-02	3.6699E-01	2.1684E-01	7.9926E-02	3.3592E-02
7.000	1.1446E+00	5.5145E-02	3.6699E-01	2.1684E-01	8.1090E-02	3.4134E-02
7.300	1.1660E+00	5.6050E-02	3.6699E-01	2.1684E-01	8.2249E-02	3.4650E-02
7.600	1.1874E+00	5.6940E-02	3.6699E-01	2.1684E-01	8.3403E-02	3.5142E-02
7.791	1.2009E+00	5.7499E-02	3.6699E-01	2.1684E-01	8.4135E-02	3.5444E-02
7.844	1.2046E+00	5.7654E-02	3.6699E-01	2.1684E-01	8.4339E-02	3.5526E-02
8.000	1.2156E+00	5.8105E-02	3.6699E-01	2.1684E-01	8.4935E-02	3.5764E-02
8.300	1.2368E+00	5.8965E-02	3.6699E-01	2.1684E-01	8.5327E-02	3.6052E-02
8.600	1.2578E+00	5.9812E-02	3.6699E-01	2.1684E-01	8.5718E-02	3.6328E-02
8.700	1.2648E+00	6.0091E-02	3.6699E-01	2.1684E-01	8.5847E-02	3.6417E-02

9.000	1.3072E+00	6.1774E-02	3.6699E-01	2.1684E-01	8.6236E-02	3.6677E-02
9.300	1.3542E+00	6.3624E-02	3.6699E-01	2.1684E-01	8.6623E-02	3.6926E-02
9.600	1.4010E+00	6.5452E-02	3.6699E-01	2.1684E-01	8.7009E-02	3.7165E-02
9.871	1.4430E+00	6.7081E-02	3.6699E-01	2.1684E-01	8.7355E-02	3.7372E-02
10.200	1.4941E+00	6.9044E-02	3.6699E-01	2.1684E-01	8.7776E-02	3.7614E-02
16.700	2.4667E+00	1.0437E-01	3.6699E-01	2.1684E-01	9.5786E-02	4.1026E-02
24.000	2.9320E+00	1.2026E-01	3.6699E-01	2.1684E-01	1.0419E-01	4.3331E-02
96.000	3.2534E+00	1.3071E-01	3.6699E-01	2.1684E-01	1.2246E-01	4.5819E-02
720.000	3.9735E+00	1.5349E-01	3.6699E-01	2.1684E-01	1.3702E-01	4.7217E-02

## File rev1ww\_env.out

## Cumulative Dose Summary

Time (hr)	CR		EAB		LPZ	
	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)
0.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.008	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.166	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.420	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.465	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.508	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.512	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.702	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.934	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.009	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.129	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
1.129	1.7311E-10	8.1361E-12	0.0000E+00	0.0000E+00	6.1468E-09	7.0850E-10
1.296	9.8778E-02	4.7339E-03	0.0000E+00	0.0000E+00	7.2488E-03	1.3620E-03
1.463	2.4414E-01	1.1800E-02	0.0000E+00	0.0000E+00	1.4246E-02	3.0314E-03
1.500	2.6364E-01	1.2753E-02	0.0000E+00	0.0000E+00	1.5166E-02	3.2706E-03
1.750	3.6543E-01	1.7756E-02	1.1901E-01	3.4349E-02	2.6560E-02	6.5594E-03
2.000	4.4147E-01	2.1531E-02	2.0900E-01	6.5414E-02	3.5176E-02	9.5337E-03
2.007	4.4341E-01	2.1628E-02	2.1129E-01	6.6279E-02	3.5396E-02	9.6165E-03
2.008	4.4359E-01	2.1637E-02	2.1151E-01	6.6361E-02	3.5417E-02	9.6244E-03
2.239	5.7559E-01	2.8529E-02	3.8717E-01	1.6069E-01	5.2236E-02	1.8656E-02
2.490	7.0334E-01	3.5474E-02	5.3701E-01	2.7031E-01	6.6581E-02	2.9151E-02
2.740	8.0244E-01	4.0961E-02	6.5594E-01	3.7178E-01	7.7969E-02	3.8867E-02
2.803	8.2552E-01	4.2238E-02	6.8391E-01	3.9647E-01	8.0646E-02	4.1231E-02
3.055	9.1343E-01	4.7067E-02	7.9098E-01	4.9111E-01	9.0898E-02	5.0291E-02
3.087	9.2450E-01	4.7669E-02	8.0449E-01	5.0293E-01	9.2191E-02	5.1424E-02
3.340	1.0093E+00	5.2234E-02	9.0821E-01	5.9200E-01	1.0212E-01	5.9952E-02
3.500	1.0623E+00	5.5043E-02	9.7318E-01	6.4598E-01	1.0834E-01	6.5119E-02
3.750	1.1446E+00	5.9330E-02	9.7318E-01	6.4598E-01	1.1280E-01	6.8689E-02
3.775	1.1528E+00	5.9751E-02	9.7318E-01	6.4598E-01	1.1324E-01	6.9034E-02
3.778	1.1538E+00	5.9804E-02	9.7318E-01	6.4598E-01	1.1330E-01	6.9077E-02
4.200	1.2917E+00	6.6799E-02	9.7318E-01	6.4598E-01	1.2077E-01	7.4693E-02
4.500	1.3892E+00	7.1622E-02	9.7318E-01	6.4598E-01	1.2605E-01	7.8425E-02
4.633	1.4324E+00	7.3726E-02	9.7318E-01	6.4598E-01	1.2839E-01	8.0013E-02
5.000	1.5507E+00	7.9394E-02	9.7318E-01	6.4598E-01	1.3480E-01	8.4176E-02
5.041	1.5640E+00	8.0021E-02	9.7318E-01	6.4598E-01	1.3552E-01	8.4625E-02
5.222	1.6220E+00	8.2746E-02	9.7318E-01	6.4598E-01	1.3866E-01	8.6558E-02
5.500	1.7111E+00	8.6869E-02	9.7318E-01	6.4598E-01	1.4348E-01	8.9408E-02
5.800	1.8068E+00	9.1227E-02	9.7318E-01	6.4598E-01	1.4867E-01	9.2329E-02
6.100	1.9021E+00	9.5496E-02	9.7318E-01	6.4598E-01	1.5383E-01	9.5098E-02
6.400	1.9970E+00	9.9682E-02	9.7318E-01	6.4598E-01	1.5897E-01	9.7727E-02
6.700	2.0916E+00	1.0379E-01	9.7318E-01	6.4598E-01	1.6410E-01	1.0022E-01
7.000	2.1857E+00	1.0783E-01	9.7318E-01	6.4598E-01	1.6920E-01	1.0260E-01
7.300	2.2796E+00	1.1179E-01	9.7318E-01	6.4598E-01	1.7428E-01	1.0487E-01
7.600	2.3730E+00	1.1570E-01	9.7318E-01	6.4598E-01	1.7934E-01	1.0702E-01
7.791	2.4323E+00	1.1815E-01	9.7318E-01	6.4598E-01	1.8256E-01	1.0835E-01
7.844	2.4488E+00	1.1883E-01	9.7318E-01	6.4598E-01	1.8345E-01	1.0871E-01
8.000	2.4971E+00	1.2081E-01	9.7318E-01	6.4598E-01	1.8606E-01	1.0975E-01
8.300	2.5897E+00	1.2458E-01	9.7318E-01	6.4598E-01	1.8778E-01	1.1101E-01

8.600	2.6820E+00	1.2829E-01	9.7318E-01	6.4598E-01	1.8949E-01	1.1222E-01
8.900	2.8296E+00	1.3417E-01	9.7318E-01	6.4598E-01	1.9120E-01	1.1338E-01
9.200	3.0359E+00	1.4232E-01	9.7318E-01	6.4598E-01	1.9290E-01	1.1449E-01
9.500	3.2415E+00	1.5036E-01	9.7318E-01	6.4598E-01	1.9459E-01	1.1555E-01
9.800	3.4463E+00	1.5832E-01	9.7318E-01	6.4598E-01	1.9628E-01	1.1657E-01
9.871	3.4943E+00	1.6017E-01	9.7318E-01	6.4598E-01	1.9668E-01	1.1680E-01
10.200	3.7183E+00	1.6878E-01	9.7318E-01	6.4598E-01	1.9852E-01	1.1786E-01
24.000	1.0253E+01	4.0138E-01	9.7318E-01	6.4598E-01	2.7053E-01	1.4296E-01
96.000	1.1663E+01	4.4721E-01	9.7318E-01	6.4598E-01	3.5063E-01	1.5387E-01
720.000	1.4821E+01	5.4712E-01	9.7318E-01	6.4598E-01	4.1448E-01	1.6000E-01

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Cumulative Dose Summary

Time (hr)	CR		EAB		LPZ	
	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)
0.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.008	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.166	2.1805E-02	1.0223E-03	0.0000E+00	0.0000E+00	5.7877E-04	2.8457E-05
0.420	2.6021E-01	1.2186E-02	0.0000E+00	0.0000E+00	4.6385E-03	2.2835E-04
0.465	3.1088E-01	1.4555E-02	0.0000E+00	0.0000E+00	5.4426E-03	2.6808E-04
0.508	3.6165E-01	1.6927E-02	0.0000E+00	0.0000E+00	6.2558E-03	3.0832E-04
0.512	3.6607E-01	1.7133E-02	0.0000E+00	0.0000E+00	6.3279E-03	3.1189E-04
0.702	6.8887E-01	3.3288E-02	0.0000E+00	0.0000E+00	1.2091E-02	6.2369E-04
0.934	1.3528E+00	7.0021E-02	0.0000E+00	0.0000E+00	2.2388E-02	1.2328E-03
1.009	1.5308E+00	7.9997E-02	0.0000E+00	0.0000E+00	2.5090E-02	1.3988E-03
1.129	1.8422E+00	9.7902E-02	0.0000E+00	0.0000E+00	3.0330E-02	1.7321E-03
1.129	1.8425E+00	9.7920E-02	0.0000E+00	0.0000E+00	3.0335E-02	1.7324E-03
1.296	2.4120E+00	1.3170E-01	0.0000E+00	0.0000E+00	3.9344E-02	2.3214E-03
1.463	2.9114E+00	1.6131E-01	0.0000E+00	0.0000E+00	4.6860E-02	2.8269E-03
1.715	3.5345E+00	1.9797E-01	0.0000E+00	0.0000E+00	5.6343E-02	3.4982E-03
1.965	4.0664E+00	2.2889E-01	0.0000E+00	0.0000E+00	6.4533E-02	4.1234E-03
2.007	4.1518E+00	2.3382E-01	0.0000E+00	0.0000E+00	6.5855E-02	4.2291E-03
2.008	4.1532E+00	2.3390E-01	0.0000E+00	0.0000E+00	6.5877E-02	4.2309E-03
2.239	4.5765E+00	2.5803E-01	0.0000E+00	0.0000E+00	7.2276E-02	4.7693E-03
2.490	4.9104E+00	2.7623E-01	0.0000E+00	0.0000E+00	7.7231E-02	5.2445E-03
2.740	5.1409E+00	2.8789E-01	0.0000E+00	0.0000E+00	8.0672E-02	5.6375E-03
2.803	5.1886E+00	2.9016E-01	0.0000E+00	0.0000E+00	8.1391E-02	5.7296E-03
3.055	5.3538E+00	2.9764E-01	0.0000E+00	0.0000E+00	8.3904E-02	6.0822E-03
3.087	5.3731E+00	2.9848E-01	0.0000E+00	0.0000E+00	8.4199E-02	6.1267E-03
3.340	5.5140E+00	3.0439E-01	0.0000E+00	0.0000E+00	8.6371E-02	6.4722E-03
3.590	5.6432E+00	3.0958E-01	0.0000E+00	0.0000E+00	8.8372E-02	6.8151E-03
3.775	5.7193E+00	3.1255E-01	0.0000E+00	0.0000E+00	8.9786E-02	7.0704E-03
3.778	5.7199E+00	3.1257E-01	0.0000E+00	0.0000E+00	8.9809E-02	7.0747E-03
4.200	5.7853E+00	3.1504E-01	0.0000E+00	0.0000E+00	9.2908E-02	7.6657E-03
4.500	5.8297E+00	3.1669E-01	0.0000E+00	0.0000E+00	9.5051E-02	8.0935E-03
4.633	5.8493E+00	3.1741E-01	0.0000E+00	0.0000E+00	9.5995E-02	8.2852E-03
5.000	5.9028E+00	3.1935E-01	0.0000E+00	0.0000E+00	9.8575E-02	8.8168E-03
5.041	5.9088E+00	3.1957E-01	0.0000E+00	0.0000E+00	9.8864E-02	8.8770E-03
5.222	5.9350E+00	3.2051E-01	0.0000E+00	0.0000E+00	1.0013E-01	9.1415E-03
5.500	5.9754E+00	3.2197E-01	0.0000E+00	0.0000E+00	1.0208E-01	9.5506E-03
5.800	6.0190E+00	3.2354E-01	0.0000E+00	0.0000E+00	1.0419E-01	9.9943E-03
6.100	6.0626E+00	3.2511E-01	0.0000E+00	0.0000E+00	1.0630E-01	1.0439E-02
6.400	6.1063E+00	3.2668E-01	0.0000E+00	0.0000E+00	1.0841E-01	1.0885E-02
6.700	6.1500E+00	3.2824E-01	0.0000E+00	0.0000E+00	1.1052E-01	1.1329E-02
7.000	6.1937E+00	3.2981E-01	0.0000E+00	0.0000E+00	1.1263E-01	1.1773E-02
7.300	6.2374E+00	3.3137E-01	0.0000E+00	0.0000E+00	1.1474E-01	1.2216E-02
7.600	6.2811E+00	3.3293E-01	0.0000E+00	0.0000E+00	1.1685E-01	1.2656E-02
7.791	6.3090E+00	3.3392E-01	0.0000E+00	0.0000E+00	1.1820E-01	1.2935E-02
7.844	6.3167E+00	3.3420E-01	0.0000E+00	0.0000E+00	1.1857E-01	1.3012E-02
8.000	6.3394E+00	3.3501E-01	0.0000E+00	0.0000E+00	1.1967E-01	1.3239E-02
8.300	6.3831E+00	3.3656E-01	0.0000E+00	0.0000E+00	1.2073E-01	1.3640E-02
8.600	6.4268E+00	3.3811E-01	0.0000E+00	0.0000E+00	1.2180E-01	1.4038E-02
8.900	6.4705E+00	3.3966E-01	0.0000E+00	0.0000E+00	1.2286E-01	1.4433E-02

9.200	6.5141E+00	3.4121E-01	0.0000E+00	0.0000E+00	1.2392E-01	1.4825E-02
9.500	6.5576E+00	3.4275E-01	0.0000E+00	0.0000E+00	1.2498E-01	1.5212E-02
9.800	6.6011E+00	3.4429E-01	0.0000E+00	0.0000E+00	1.2604E-01	1.5596E-02
9.871	6.6114E+00	3.4465E-01	0.0000E+00	0.0000E+00	1.2629E-01	1.5685E-02
10.200	6.6591E+00	3.4633E-01	0.0000E+00	0.0000E+00	1.2745E-01	1.6101E-02
11.000	6.7746E+00	3.5039E-01	0.0000E+00	0.0000E+00	1.3027E-01	1.7089E-02
24.000	7.1220E+00	3.6226E-01	0.0000E+00	0.0000E+00	1.4503E-01	2.1278E-02
83.000	8.0198E+00	3.9157E-01	0.0000E+00	0.0000E+00	1.9563E-01	2.8655E-02
707.000	1.0722E+01	4.7719E-01	0.0000E+00	0.0000E+00	2.4206E-01	3.3263E-02
720.000	1.0735E+01	4.7760E-01	0.0000E+00	0.0000E+00	2.4206E-01	3.3263E-02

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Time (hr)	Cumulative Dose Summary					
	CR Thyroid (rem)	TEDE (rem)	Thyroid (rem)	EAB TEDE (rem)	Thyroid (rem)	LPZ TEDE (rem)
0.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.008	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.166	6.0686E-02	2.7225E-03	0.0000E+00	0.0000E+00	1.6002E-02	9.8464E-04
0.420	2.0936E-01	9.4967E-03	0.0000E+00	0.0000E+00	3.8297E-02	2.9200E-03
0.465	2.2413E-01	1.0186E-02	0.0000E+00	0.0000E+00	4.0833E-02	3.2474E-03
0.508	2.3998E-01	1.0926E-02	0.0000E+00	0.0000E+00	4.4215E-02	3.6273E-03
0.512	2.4164E-01	1.1003E-02	0.0000E+00	0.0000E+00	4.4617E-02	3.6659E-03
0.702	5.3027E-01	2.4951E-02	0.0000E+00	0.0000E+00	1.0782E-01	8.9653E-03
0.934	7.7938E-01	3.7732E-02	0.0000E+00	0.0000E+00	1.3746E-01	1.5677E-02
1.009	8.1924E-01	4.0004E-02	0.0000E+00	0.0000E+00	1.4737E-01	1.8443E-02
1.129	1.0164E+00	5.0292E-02	0.0000E+00	0.0000E+00	1.9048E-01	2.4829E-02
1.129	1.0166E+00	5.0304E-02	0.0000E+00	0.0000E+00	1.9053E-01	2.4835E-02
1.296	1.2996E+00	6.5245E-02	0.0000E+00	0.0000E+00	2.3184E-01	3.4126E-02
1.463	1.4568E+00	7.4196E-02	0.0000E+00	0.0000E+00	2.5790E-01	4.3890E-02
1.500	1.4863E+00	7.5933E-02	0.0000E+00	0.0000E+00	2.6277E-01	4.6096E-02
1.750	1.6648E+00	8.6793E-02	1.9411E-01	1.0162E-01	2.9325E-01	6.2051E-02
2.000	1.8301E+00	9.7282E-02	3.7579E-01	2.1450E-01	3.2177E-01	7.9774E-02
2.007	1.8348E+00	9.7586E-02	3.8096E-01	2.1795E-01	3.2259E-01	8.0316E-02
2.008	1.8352E+00	9.7615E-02	3.8146E-01	2.1828E-01	3.2266E-01	8.0368E-02
2.239	1.9469E+00	1.0552E-01	4.9322E-01	3.2950E-01	3.4021E-01	9.7831E-02
2.490	2.0000E+00	1.1067E-01	5.4556E-01	4.4251E-01	3.4843E-01	1.1557E-01
2.740	2.0250E+00	1.1426E-01	5.7085E-01	5.4699E-01	3.5240E-01	1.3198E-01
2.803	2.0293E+00	1.1505E-01	5.7537E-01	5.7240E-01	3.5311E-01	1.3597E-01
3.055	2.0430E+00	1.1792E-01	5.8982E-01	6.6969E-01	3.5538E-01	1.5124E-01
3.087	2.0445E+00	1.1827E-01	5.9143E-01	6.8184E-01	3.5563E-01	1.5315E-01
3.340	2.0551E+00	1.2085E-01	6.0296E-01	7.7324E-01	3.5744E-01	1.6750E-01
3.500	2.0613E+00	1.2239E-01	6.0975E-01	8.2855E-01	3.5851E-01	1.7619E-01
3.750	2.0706E+00	1.2469E-01	6.0975E-01	8.2855E-01	3.6012E-01	1.8917E-01
3.775	2.0715E+00	1.2492E-01	6.0975E-01	8.2855E-01	3.6028E-01	1.9042E-01
3.778	2.0716E+00	1.2494E-01	6.0975E-01	8.2855E-01	3.6030E-01	1.9058E-01
4.000	2.0797E+00	1.2688E-01	6.0975E-01	8.2855E-01	3.6170E-01	2.0147E-01
4.400	2.0941E+00	1.3021E-01	6.0975E-01	8.2855E-01	3.6184E-01	2.0245E-01
4.633	2.1025E+00	1.3204E-01	6.0975E-01	8.2855E-01	3.6191E-01	2.0299E-01
5.000	2.1156E+00	1.3477E-01	6.0975E-01	8.2855E-01	3.6203E-01	2.0378E-01
5.041	2.1170E+00	1.3506E-01	6.0975E-01	8.2855E-01	3.6205E-01	2.0387E-01
5.222	2.1234E+00	1.3634E-01	6.0975E-01	8.2855E-01	3.6210E-01	2.0423E-01
5.500	2.1333E+00	1.3823E-01	6.0975E-01	8.2855E-01	3.6219E-01	2.0477E-01
5.800	2.1438E+00	1.4017E-01	6.0975E-01	8.2855E-01	3.6229E-01	2.0533E-01
6.100	2.1543E+00	1.4203E-01	6.0975E-01	8.2855E-01	3.6239E-01	2.0585E-01
6.400	2.1648E+00	1.4380E-01	6.0975E-01	8.2855E-01	3.6248E-01	2.0634E-01
6.700	2.1753E+00	1.4549E-01	6.0975E-01	8.2855E-01	3.6258E-01	2.0681E-01
7.000	2.1857E+00	1.4711E-01	6.0975E-01	8.2855E-01	3.6268E-01	2.0726E-01
7.300	2.1960E+00	1.4867E-01	6.0975E-01	8.2855E-01	3.6277E-01	2.0768E-01
7.600	2.2063E+00	1.5016E-01	6.0975E-01	8.2855E-01	3.6287E-01	2.0808E-01
7.791	2.2129E+00	1.5108E-01	6.0975E-01	8.2855E-01	3.6293E-01	2.0833E-01
7.844	2.2147E+00	1.5133E-01	6.0975E-01	8.2855E-01	3.6294E-01	2.0839E-01
8.000	2.2200E+00	1.5206E-01	6.0975E-01	8.2855E-01	3.6299E-01	2.0859E-01
8.300	2.2303E+00	1.5342E-01	6.0975E-01	8.2855E-01	3.6302E-01	2.0883E-01
8.600	2.2404E+00	1.5473E-01	6.0975E-01	8.2855E-01	3.6306E-01	2.0907E-01
8.700	2.2438E+00	1.5516E-01	6.0975E-01	8.2855E-01	3.6307E-01	2.0915E-01

9.000	2.2611E+00	1.5729E-01	6.0975E-01	8.2855E-01	3.6310E-01	2.0937E-01
9.300	2.2799E+00	1.5954E-01	6.0975E-01	8.2855E-01	3.6313E-01	2.0959E-01
9.600	2.2986E+00	1.6172E-01	6.0975E-01	8.2855E-01	3.6317E-01	2.0979E-01
9.871	2.3155E+00	1.6362E-01	6.0975E-01	8.2855E-01	3.6320E-01	2.0997E-01
10.200	2.3359E+00	1.6587E-01	6.0975E-01	8.2855E-01	3.6323E-01	2.1017E-01
16.700	2.7251E+00	2.0015E-01	6.0975E-01	8.2855E-01	3.6391E-01	2.1303E-01
24.000	2.9485E+00	2.1493E-01	6.0975E-01	8.2855E-01	3.6461E-01	2.1488E-01
96.000	3.0061E+00	2.1796E-01	6.0975E-01	8.2855E-01	3.6626E-01	2.1690E-01
720.000	3.0273E+00	2.1889E-01	6.0975E-01	8.2855E-01	3.6769E-01	2.1800E-01

File rev1esf\_env.out

Cumulative Dose Summary						
Time (hr)	CR		EAB		LPZ	
	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)	Thyroid (rem)	TEDE (rem)
0.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.008	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
0.166	1.7839E-03	5.6643E-05	0.0000E+00	0.0000E+00	4.7041E-04	1.7693E-05
0.420	1.6599E-02	5.2707E-04	0.0000E+00	0.0000E+00	3.3891E-03	1.3174E-04
0.465	2.0775E-02	6.5966E-04	0.0000E+00	0.0000E+00	4.1750E-03	1.6299E-04
0.508	2.5311E-02	8.0366E-04	0.0000E+00	0.0000E+00	5.0220E-03	1.9681E-04
0.512	2.5717E-02	8.1656E-04	0.0000E+00	0.0000E+00	5.0977E-03	1.9984E-04
0.702	5.2905E-02	1.6811E-03	0.0000E+00	0.0000E+00	1.0217E-02	4.2085E-04
0.934	1.0498E-01	3.3405E-03	0.0000E+00	0.0000E+00	1.9785E-02	8.6619E-04
1.009	1.2642E-01	4.0240E-03	0.0000E+00	0.0000E+00	2.3679E-02	1.0519E-03
1.129	1.6519E-01	5.2597E-03	0.0000E+00	0.0000E+00	3.0682E-02	1.3893E-03
1.129	1.6522E-01	5.2608E-03	0.0000E+00	0.0000E+00	3.0688E-02	1.3896E-03
1.296	2.2837E-01	7.2741E-03	0.0000E+00	0.0000E+00	4.2033E-02	1.9423E-03
1.463	3.0231E-01	9.6311E-03	0.0000E+00	0.0000E+00	5.5251E-02	2.5928E-03
1.500	3.2015E-01	1.0199E-02	0.0000E+00	0.0000E+00	5.8431E-02	2.7501E-03
1.750	4.5435E-01	1.4476E-02	1.5203E-01	7.5757E-03	8.2302E-02	3.9396E-03
2.000	6.1233E-01	1.9510E-02	3.3036E-01	1.6566E-02	1.1030E-01	5.3511E-03
2.007	6.1730E-01	1.9668E-02	3.3596E-01	1.6850E-02	1.1118E-01	5.3957E-03
2.008	6.1778E-01	1.9683E-02	3.3650E-01	1.6877E-02	1.1126E-01	5.3999E-03
2.239	7.7787E-01	2.4781E-02	5.1422E-01	2.5805E-02	1.3917E-01	6.8017E-03
2.490	9.5251E-01	3.0336E-02	7.0746E-01	3.5373E-02	1.6951E-01	8.3040E-03
2.740	1.1255E+00	3.5832E-02	8.9883E-01	4.4783E-02	1.9956E-01	9.7816E-03
2.803	1.1692E+00	3.7220E-02	9.4718E-01	4.7156E-02	2.0715E-01	1.0154E-02
3.055	1.3425E+00	4.2723E-02	1.1390E+00	5.6561E-02	2.3726E-01	1.1631E-02
3.087	1.3648E+00	4.3432E-02	1.1637E+00	5.7773E-02	2.4114E-01	1.1821E-02
3.340	1.5380E+00	4.8928E-02	1.3553E+00	6.7171E-02	2.7122E-01	1.3297E-02
3.500	1.6474E+00	5.2399E-02	1.4763E+00	7.3114E-02	2.9023E-01	1.4230E-02
3.750	1.8178E+00	5.7804E-02	1.4763E+00	7.3114E-02	3.1984E-01	1.5685E-02
3.775	1.8348E+00	5.8341E-02	1.4763E+00	7.3114E-02	3.2278E-01	1.5830E-02
3.778	1.8369E+00	5.8408E-02	1.4763E+00	7.3114E-02	3.2315E-01	1.5848E-02
4.000	1.9877E+00	6.3189E-02	1.4763E+00	7.3114E-02	3.4935E-01	1.7137E-02
4.400	2.2584E+00	7.1769E-02	1.4763E+00	7.3114E-02	3.5183E-01	1.7260E-02
4.633	2.4156E+00	7.6751E-02	1.4763E+00	7.3114E-02	3.5328E-01	1.7332E-02
5.000	2.6617E+00	8.4544E-02	1.4763E+00	7.3114E-02	3.5554E-01	1.7444E-02
5.041	2.6893E+00	8.5419E-02	1.4763E+00	7.3114E-02	3.5579E-01	1.7457E-02
5.222	2.8100E+00	8.9242E-02	1.4763E+00	7.3114E-02	3.5690E-01	1.7512E-02
5.500	2.9953E+00	9.5105E-02	1.4763E+00	7.3114E-02	3.5860E-01	1.7597E-02
5.800	3.1944E+00	1.0141E-01	1.4763E+00	7.3114E-02	3.6043E-01	1.7689E-02
6.100	3.3927E+00	1.0768E-01	1.4763E+00	7.3114E-02	3.6225E-01	1.7780E-02
6.400	3.5903E+00	1.1393E-01	1.4763E+00	7.3114E-02	3.6407E-01	1.7871E-02
6.700	3.7872E+00	1.2015E-01	1.4763E+00	7.3114E-02	3.6587E-01	1.7962E-02
7.000	3.9833E+00	1.2635E-01	1.4763E+00	7.3114E-02	3.6767E-01	1.8052E-02
7.300	4.1786E+00	1.3252E-01	1.4763E+00	7.3114E-02	3.6947E-01	1.8142E-02
7.600	4.3733E+00	1.3867E-01	1.4763E+00	7.3114E-02	3.7126E-01	1.8231E-02
7.791	4.4968E+00	1.4257E-01	1.4763E+00	7.3114E-02	3.7239E-01	1.8288E-02
7.844	4.5310E+00	1.4365E-01	1.4763E+00	7.3114E-02	3.7270E-01	1.8304E-02
8.000	4.6317E+00	1.4683E-01	1.4763E+00	7.3114E-02	3.7363E-01	1.8350E-02
8.300	4.8247E+00	1.5292E-01	1.4763E+00	7.3114E-02	3.7425E-01	1.8393E-02
8.600	5.0170E+00	1.5899E-01	1.4763E+00	7.3114E-02	3.7487E-01	1.8435E-02
8.700	5.0809E+00	1.6101E-01	1.4763E+00	7.3114E-02	3.7508E-01	1.8450E-02

9.000	5.4070E+00	1.7129E-01	1.4763E+00	7.3114E-02	3.7570E-01	1.8492E-02
9.300	5.7620E+00	1.8249E-01	1.4763E+00	7.3114E-02	3.7631E-01	1.8534E-02
9.600	6.1158E+00	1.9364E-01	1.4763E+00	7.3114E-02	3.7693E-01	1.8576E-02
9.871	6.4338E+00	2.0366E-01	1.4763E+00	7.3114E-02	3.7748E-01	1.8613E-02
10.200	6.8198E+00	2.1582E-01	1.4763E+00	7.3114E-02	3.7815E-01	1.8659E-02
16.700	1.4180E+01	4.4701E-01	1.4763E+00	7.3114E-02	3.9091E-01	1.9523E-02
24.000	1.8415E+01	5.7928E-01	1.4763E+00	7.3114E-02	4.0434E-01	2.0354E-02
96.000	2.0525E+01	6.4410E-01	1.4763E+00	7.3114E-02	4.6668E-01	2.2683E-02
720.000	2.1354E+01	6.6936E-01	1.4763E+00	7.3114E-02	5.2239E-01	2.4464E-02

Appendix C6. Comparison of source inventories at 8.7 and 13 hours with MS7 values.

t = 0	MS7 Ci	libfile	t = 8.7	MS7 Ci	libfile	t = 13	MS7 Ci	libfile
			(8pt7oc60.nif)			(153oc60.nif)		
Am-241	8.50E+00	8.50E+00	Am-241	8.51E+00	8.50E+00	Am-241	8.51E+00	8.50E+00
Ba-137m	1.81E+03	1.81E+03	Ba-137m	4.31E+03	4.56E+03	Ba-137m	4.31E+03	4.56E+03
Ba-139	4.61E+04	4.61E+04	Ba-139	5.93E+02	5.93E+02	Ba-139	6.89E+01	6.90E+01
Ba-140	4.51E+04	4.51E+04	Ba-140	4.42E+04	4.42E+04	Ba-140	4.38E+04	4.38E+04
Ce-141	4.31E+04	4.31E+04	Ce-141	4.29E+04	4.29E+04	Ce-141	4.28E+04	4.28E+04
Ce-143	3.98E+04	3.98E+04	Ce-143	3.32E+04	3.30E+04	Ce-143	3.03E+04	3.00E+04
Ce-144	3.48E+04	3.48E+04	Ce-144	3.48E+04	3.48E+04	Ce-144	3.48E+04	3.48E+04
Cm-242	1.78E+03	1.78E+03	Cm-242	1.78E+03	1.78E+03	Cm-242	1.78E+03	1.78E+03
Cm-244	7.10E+01	7.10E+01	Cm-244	7.10E+01	7.10E+01	Cm-244	7.10E+01	7.10E+01
Cs-134	4.83E+03	4.83E+03	Cs-134	4.83E+03	4.83E+03	Cs-134	4.83E+03	4.83E+03
Cs-136	1.39E+03	1.39E+03	Cs-136	1.36E+03	1.36E+03	Cs-136	1.35E+03	1.35E+03
Cs-137	4.56E+03	4.56E+03	Cs-137	4.56E+03	4.56E+03	Cs-137	4.56E+03	4.56E+03
I-131org	-	2.51E+04	I-131org	-	2.43E+04	I-131org	-	2.40E+04
I-131elem	-	2.51E+04	I-131elem	-	2.44E+04	I-131elem	-	2.41E+04
I-131part	-	2.51E+04	I-131part	-	2.43E+04	I-131part	-	2.40E+04
I-131	2.51E+04	-	I-131	2.44E+04	-	I-131	2.41E+04	-
I-132org	-	3.66E+04	I-132org	-	2.75E+03	I-132org	-	7.63E+02
I-132elem	-	3.66E+04	I-132elem	-	3.43E+04	I-132elem	-	3.30E+04
I-132part	-	3.66E+04	I-132part	-	2.75E+03	I-132part	-	7.63E+02
I-132	3.66E+04	-	I-132	3.43E+04	-	I-132	3.30E+04	-
I-133org	-	5.18E+04	I-133org	-	3.88E+04	I-133org	-	3.37E+04
I-133elem	-	5.18E+04	I-133elem	-	3.88E+04	I-133elem	-	3.37E+04
I-133part	-	5.18E+04	I-133part	-	3.88E+04	I-133part	-	3.37E+04
I-133	5.18E+04	-	I-133	3.88E+04	-	I-133	3.36E+04	-
I-134org	-	5.60E+04	I-134org	-	5.19E+01	I-134org	-	1.64E+00
I-134elem	-	5.60E+04	I-134elem	-	5.19E+01	I-134elem	-	1.64E+00
I-134part	-	5.60E+04	I-134part	-	5.19E+01	I-134part	-	1.64E+00
I-134	5.60E+04	-	I-134	5.76E+01	-	I-134	1.92E+00	-
I-135org	-	4.82E+04	I-135org	-	1.97E+04	I-135org	-	1.26E+04
I-135elem	-	4.82E+04	I-135elem	-	1.97E+04	I-135elem	-	1.26E+04
I-135part	-	4.82E+04	I-135part	-	1.97E+04	I-135part	-	1.26E+04
I-135	4.82E+04	-	I-135	1.94E+04	-	I-135	1.23E+04	-
Kr-83m	4.15E+03	4.15E+03	Kr-83m	1.54E+02	1.60E+02	Kr-83m	3.02E+01	3.19E+01
Kr-85	4.03E+02	4.03E+02	Kr-85	4.03E+02	4.03E+02	Kr-85	4.03E+02	4.03E+02
Kr-85m	6.94E+03	6.94E+03	Kr-85m	1.81E+03	1.76E+03	Kr-85m	9.29E+02	8.90E+02
Kr-87	1.29E+04	1.29E+04	Kr-87	1.12E+02	1.10E+02	Kr-87	1.08E+01	1.05E+01
Kr-88	1.83E+04	1.83E+04	Kr-88	2.19E+03	2.12E+03	Kr-88	7.66E+02	7.31E+02
Kr-89	3.98E+04	3.98E+04	Kr-89	7.46E-46	4.57E-16	Kr-89	1.97E-70	6.50E-18
La-140	4.63E+04	4.63E+04	La-140	4.61E+04	4.61E+04	La-140	4.59E+04	4.59E+04
La-141	4.26E+04	4.26E+04	La-141	9.22E+03	9.07E+03	La-141	4.33E+03	4.22E+03
La-142	4.12E+04	4.12E+04	La-142	9.28E+02	7.96E+02	La-142	1.42E+02	1.13E+02
Mo-99	4.70E+04	4.70E+04	Mo-99	4.29E+04	4.30E+04	Mo-99	4.10E+04	4.11E+04
Nb-95	4.46E+04	4.46E+04	Nb-95	4.46E+04	4.46E+04	Nb-95	4.46E+04	4.46E+04
Nd-147	1.68E+04	1.68E+04	Nd-147	1.64E+04	1.64E+04	Nd-147	1.62E+04	1.63E+04
Np-239	5.07E+05	5.07E+05	Np-239	4.56E+05	4.55E+05	Np-239	4.32E+05	4.32E+05
Pr-143	3.97E+04	3.97E+04	Pr-143	3.96E+04	3.96E+04	Pr-143	3.96E+04	3.96E+04

Pu-238	1.04E+02	1.04E+02	Pu-238	1.04E+02	1.04E+02	Pu-238	1.04E+02	1.04E+02
Pu-239	1.43E+01	1.43E+01	Pu-239	1.43E+01	1.43E+01	Pu-239	1.43E+01	1.43E+01
Pu-240	2.10E+01	2.10E+01	Pu-240	2.10E+01	2.10E+01	Pu-240	2.10E+01	2.10E+01
Pu-241	4.99E+03	4.99E+03	Pu-241	4.99E+03	4.99E+03	Pu-241	4.99E+03	4.99E+03
Rb-86	4.03E+01	4.03E+01	Rb-86	3.98E+01	3.98E+01	Rb-86	3.95E+01	3.95E+01
Rh-105	2.49E+04	2.49E+04	Rh-105	2.32E+04	2.32E+04	Rh-105	2.17E+04	2.17E+04
Ru-103	3.98E+04	3.98E+04	Ru-103	3.95E+04	3.96E+04	Ru-103	3.94E+04	3.94E+04
Ru-105	2.57E+04	2.57E+04	Ru-105	6.61E+03	6.86E+03	Ru-105	3.38E+03	3.57E+03
Ru-106	1.41E+04	1.41E+04	Ru-106	1.41E+04	1.41E+04	Ru-106	1.41E+04	1.41E+04
Sb-127	2.33E+03	2.33E+03	Sb-127	2.18E+03	2.18E+03	Sb-127	2.11E+03	2.12E+03
Sb-129	8.03E+03	8.03E+03	Sb-129	2.04E+03	2.01E+03	Sb-129	1.04E+03	1.01E+03
Sr-89	2.54E+04	2.54E+04	Sr-89	2.53E+04	2.53E+04	Sr-89	2.52E+04	2.52E+04
Sr-90	3.33E+03	3.33E+03	Sr-90	3.33E+03	3.33E+03	Sr-90	3.33E+03	3.33E+03
Sr-91	3.15E+04	3.15E+04	Sr-91	1.67E+04	1.68E+04	Sr-91	1.22E+04	1.23E+04
Sr-92	3.35E+04	3.35E+04	Sr-92	3.62E+03	3.42E+03	Sr-92	1.21E+03	1.11E+03
Tc-99m	4.11E+04	4.11E+04	Tc-99m	4.01E+04	4.33E+04	Tc-99m	3.89E+04	4.28E+04
Te-127	2.32E+03	2.32E+03	Te-127	2.25E+03	2.29E+03	Te-127	2.21E+03	2.25E+03
Te-127m	3.12E+02	3.12E+02	Te-127m	3.12E+02	3.11E+02	Te-127m	3.12E+02	3.11E+02
Te-129	7.93E+03	7.93E+03	Te-129	3.06E+03	2.78E+03	Te-129	1.93E+03	1.41E+03
Te-129m	1.21E+03	1.21E+03	Te-129m	1.21E+03	1.20E+03	Te-129m	1.20E+03	1.20E+03
Te-131m	3.77E+03	3.77E+03	Te-131m	3.08E+03	3.08E+03	Te-131m	2.79E+03	2.79E+03
Te-132	3.60E+04	3.60E+04	Te-132	3.33E+04	3.33E+04	Te-132	3.21E+04	3.20E+04
Xe-131m	2.60E+02	2.60E+02	Xe-131m	2.60E+02	2.55E+02	Xe-131m	2.60E+02	2.52E+02
Xe-133	5.23E+04	5.23E+04	Xe-133	5.20E+04	5.20E+04	Xe-133	5.16E+04	5.16E+04
Xe-133m	1.38E+03	1.38E+03	Xe-133m	1.37E+03	1.24E+03	Xe-133m	1.35E+03	1.17E+03
Xe-135	1.81E+04	1.81E+04	Xe-135	2.41E+04	2.40E+04	Xe-135	2.17E+04	2.17E+04
Xe-135m	1.56E+04	1.56E+04	Xe-135m	3.32E+03	1.34E-06	Xe-135m	2.12E+03	1.42E-11
Xe-137	5.10E+04	5.10E+04	Xe-137	4.78E-37	2.26E-16	Xe-137	2.52E-57	1.29E-17
Xe-138	4.78E+04	4.78E+04	Xe-138	3.62E-07	2.69E-05	Xe-138	1.15E-12	7.22E-10
Y-90	3.42E+03	3.42E+03	Y-90	3.41E+03	3.41E+03	Y-90	3.41E+03	3.41E+03
Y-91	3.27E+04	3.27E+04	Y-91	3.27E+04	3.27E+04	Y-91	3.26E+04	3.26E+04
Y-92	3.37E+04	3.37E+04	Y-92	1.42E+04	1.42E+04	Y-92	7.29E+03	7.26E+03
Y-93	3.87E+04	3.87E+04	Y-93	2.13E+04	2.13E+04	Y-93	1.59E+04	1.58E+04
Zr-95	4.42E+04	4.42E+04	Zr-95	4.40E+04	4.40E+04	Zr-95	4.39E+04	4.39E+04
Zr-97	4.37E+04	4.37E+04	Zr-97	3.06E+04	3.07E+04	Zr-97	2.56E+04	2.58E+04

**DOSE CALCULATION DATA BASE FOR  
 APPLICATION OF THE REVISED DBA SOURCE TERM  
 TO THE OYSTER CREEK NUCLEAR GENERATING STATION**

**REVISION 0 1 2 3 4 5 **6****

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	<u>PROJECT MGR</u>		<u>REVIEWER</u>		<u>TECH CONT</u>	
	<u>Print/Sign</u>	<u>Date</u>	<u>Print/Sign</u>	<u>Date</u>	<u>Print/Sign</u>	<u>Date</u>
REV: 0	James Metcalf s/ James Metcalf	3/20/97	Dave Leaver s/ Dave Leaver	3/24/97	Nick Trikourous (GPUN) s/ Nick Trikourous	3/21/97
REV: 1	James Metcalf s/ James Metcalf	3/27/97	Dave Leaver s/ Dave Leaver	3/28/97	Nick Trikourous (GPUN) s/ Nick Trikourous	3/28/97
REV: 2	James Metcalf s/ James Metcalf	3/31/97	Dave Leaver s/ Dave Leaver	3/31/97	Nick Trikourous (GPUN) s/ Nick Trikourous	3/28/97
REV: 3	James Metcalf s/ James Metcalf	9/16/00	Dave Leaver s/ Dave Leaver	9/22/00	Gordon Wissinger (PECo) s/ Gordon Wissinger	9/29/00
REV: 4	James Metcalf s/ James Metcalf	2/7/05	Rudy Sher s/ Rudy Sher	2/7/05	Tom Mscisz (Exelon) s/ Tom Mscisz	2/15/05
REV: 5	James Metcalf s/ James Metcalf	3/19/07	Dave Leaver s/ D.E. Leaver	3/20/07	Tom Mscisz (Exelon) s/ see attached email	
REV: 6	James Metcalf s/ James Metcalf	3/22/07	Heather Pustulka s/ Heather Pustulka	3/22/07	Tom Mscisz (Exelon) s/ see attached email	

Reasons for Revision 0*PSAT 05201H.08 Rev. 3  
Attachment D*

1. First Issue of the document

Reasons for Revision 1

1. Corrected Rev 0 signature data typo for Dave Leaver
2. Provided final references for Items 3.7 and 3.8 and clarified basis for long-term mixing rate
3. Provided final references for Item 3.14 and 3.15
4. Added preliminary Item 3.17, ICV/IA (i.e., RB bypass to TB) leak rate multiplier to account for spray test line
5. Corrected Item 4.2, removal lambda for  $t=1.129$  to  $t=1.294$  hours
6. Corrected and increased the resolution of Item 4.10, preliminary maximum ratio of re-evolved elemental iodine to organic in the containment atmosphere
7. Added "Mobil 78" to Item 6.4 and finalized references for Items 6.3 and 6.4
8. Added Item 6.5, minimum suppression pool pH values
9. Provided final reference for Item 7.5
10. Added Item 7.6, preliminary organic iodine dose multiplier to account for pool reevolution of  $I_2$
11. Provided final reference for Item 8.1 and clarified table headings
12. Added Item 8.3, maximum spray HX cooling water temperature
13. Finalized reference for Item 9.1
14. Added Items 9.6 and 9.7, midplane elevation of the torus and nominal pool depth
15. Added References 21 – 24

Reasons for Revision 2

1. Provided final references for Items 3.17, 4.2, 4.3, 4.4, 4.7, 4.8, 4.10, and 7.6

Reasons for Revision 3

1. Update name of plant owner on title page
2. Change tables and update references for Items 3.14, and 3.15
3. Update references for Items 4.2, and 4.4
4. Change TB and Yard CR X/Qs in Item 5.1, and update related references
5. Change CR occupancy factor in Item 5.3, and update related reference
6. Change reference for Item 6.1

Reasons for Revision 4

1. Items 4.3, 4.8, 4.10 and 7.6 deleted
2. Item 3.15, time entry changed from 8 hours to 7.84 hours to conform with reference
3. Item 6.3 revised to refer directly to Calc PSAT 05201H.05, Rev 2 for input
4. Reference 21 (previous reference for Item 6.3) deleted
5. Item 6.5 revised and reference updated to Rev 2 of Calc PSAT 05201H.05 instead of Rev 0

*PSAT 05201H.0E Rev. 3  
Attachment D*

Reasons for Revision 5

1. Added note to Item 3.4 with Reference 26
2. Added note to Items 3.14 and 3.15 with Reference 27
3. Revised Item 5.3 and changed reference to Reference 27
4. Revised Item 5.4 and changed reference to Reference 26
5. Added Item 8.4 with Reference 27
6. Added Reference 26
7. Added Reference 27

Reasons for Revision 6

1. Revised occupancy factors (Item 5.3) and changed reference to Reference 28
2. Added Reference 28

**1. Radionuclide Data**

1.1 Core Power - Radiological Calculations - 1969 MW(t) (Reference 1 for power of 1930 MW(t) and 102% multiplier)

1.2 Core Inventory @ t=0 (Reference 2 except for \* which are from Reference 3)

<u>Nuclide</u>	<u>Per Mw(t)</u>	<u>10<sup>6</sup>Ci</u>	<u>10<sup>6</sup>Ci+2%</u>
Kr83m	4.15E+03*	8.01E+00	8.18E+00
Kr85m	6.94E+03	1.34E+01	1.37E+01
Kr85	4.03E+02	7.78E-01	7.94E-01
Kr87	1.29E+04	2.49E+01	2.54E+01
Kr88	1.83E+04	3.54E+01	3.61E+01
Kr89	3.98E+04*	7.68E+01	7.83E+01
Xe131m	2.60E+02*	5.01E-01	5.11E-01
Xe133m	1.38E+03*	2.67E+00	2.73E+00
Xe133	5.23E+04	1.01E+02	1.03E+02
Xe135m	1.56E+04*	3.01E+01	3.07E+01
Xe135	1.81E+04	3.50E+01	3.57E+01
Xe137	5.10E+04*	9.85E+01	1.00E+02
Xe138	4.78E+04*	9.22E+01	9.40E+01
I131	2.51E+04	4.84E+01	4.94E+01
I132	3.66E+04	7.06E+01	7.20E+01
I133	5.18E+04	1.00E+02	1.02E+02
I134	5.60E+04	1.08E+02	1.10E+02
I135	4.82E+04	9.31E+01	9.50E+01
Rb86	4.03E+01	7.78E-02	7.94E-02
Cs134	4.83E+03	9.32E+00	9.51E+00
Cs136	1.39E+03	2.69E+00	2.74E+00
Cs137	4.56E+03	8.80E+00	8.98E+00
Sb127	2.33E+03	4.50E+00	4.59E+00
Sb129	8.03E+03	1.55E+01	1.58E+01
Te127m	3.12E+02	6.02E-01	6.14E-01
Te127	2.32E+03	4.47E+00	4.56E+00
Te129m	1.21E+03	2.33E+00	2.38E+00
Te129	7.93E+03	1.53E+01	1.56E+01
Te131m	3.77E+03	7.28E+00	7.43E+00
Te132	3.60E+04	6.94E+01	7.08E+01
Ba137m	1.81E+03*	3.50E+00	3.57E+00
Ba139	4.61E+04	8.90E+01	9.08E+01
Ba140	4.51E+04	8.70E+01	8.87E+01
Mo99	4.70E+04	9.08E+01	9.26E+01
Tc99m	4.11E+04	7.93E+01	8.09E+01
Ru103	3.98E+04	7.68E+01	7.83E+01
Ru105	2.57E+04	4.96E+01	5.06E+01
Ru106	1.41E+04	2.73E+01	2.78E+01
Rh105	2.49E+04	4.81E+01	4.91E+01

Y90	3.42E+03	6.60E+00	6.73E+00
Y91	3.27E+04	6.32E+01	6.45E+01
Y92	3.37E+04	6.50E+01	6.63E+01
Y93	3.87E+04	7.46E+01	7.61E+01
Zr95	4.42E+04	8.53E+01	8.70E+01
Zr97	4.37E+04	8.43E+01	8.60E+01
Nb95	4.46E+04	8.61E+01	8.78E+01
La140	4.63E+04	8.94E+01	9.12E+01
La141	4.26E+04	8.23E+01	8.40E+01
La142	4.12E+04	7.95E+01	8.11E+01
Pr143	3.97E+04	7.67E+01	7.82E+01
Nd147	1.68E+04	3.24E+01	3.31E+01
Am241	8.50E+00	1.64E-02	1.67E-02
Cm242	1.78E+03	3.44E+00	3.51E+00
Cm244	7.10E+01	1.37E-01	1.40E-01
Ce141	4.31E+04	8.32E+01	8.49E+01
Ce143	3.98E+04	7.68E+01	7.83E+01
Ce144	3.48E+04	6.71E+01	6.84E+01
Np239	5.07E+05	9.78E+02	9.97E+02
Pu238	1.04E+02	2.01E-01	2.05E-01
Pu239	1.43E+01	2.75E-02	2.81E-02
Pu240	2.10E+01	4.06E-02	4.14E-02
Pu241	4.99E+03	9.64E+00	9.83E+00
Sr89	2.54E+04	4.90E+01	5.00E+01
Sr90	3.33E+03	6.43E+00	6.56E+00
Sr91	3.15E+04	6.08E+01	6.20E+01
Sr92	3.35E+04	6.47E+01	6.60E+01

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 Attachment D

1.3 Core Inventory by Mass

(Reference 2)

<u>Group</u>	<u>Grams</u>	* 1.34E5 for Cs at BOC
Cs-Rb (Cs + Rb isotopes):	2.44E5* + 2.99E4	= 2.74E5
I-Br (I + Br isotopes):	1.85E4 + 1.88E3	= 2.04E4
TeGrp (Te, Sb, Se isotopes):	3.74E4 + 1.27E3 + 4.75E3	= 4.34E4
Ba-Sr (Ba + Sr isotopes):	1.22E5 + 7.94E4	= 2.01E5
NMet (Mo, Tc, Ru, Rh, Pd isotopes):	2.8E5 + 6.66E4 + 1.88E5 + 3.77E4 + 9.33E4	= 6.66E5
LaGrp (La, Y, Zr, Nb, Pr, Nd, Pm, Sm, Eu, Am, Cm isotopes):	1.04E5 + 4.15E4 + 3.08E5 + 2.21E3 + 9.42E4 + 3.23E5 + 1.42E4 + 5.85E4 + 1.19E4 + 1.16E4 + 2.78E3	= 9.60E5
CeGrp (Ce, Np, Pu isotopes):	2.25E5 + 4.09E4 + 7.61E5	= 1.03E6

**2. Source Terms**

(Reference 4, except as noted)

2.1 Fraction of core inventory, 0 - 0.008 hours: no releases (conservative for BWR - expected to be &gt;)

2.2 Fraction of core inventory, 0.008 - 0.508 hours: Gases - Xe, Kr - 0.1 /hr (0.05 total)  
Elemental I - 4.9E-3 /hr (2.4E-3 total)  
Organic I - 1.5E-4 /hr (7.5E-5 total)Aerosols - I, Br - 0.095 /hr (0.0475 total)  
Cs, Rb - 0.1 /hr (0.05 total)2.3 Fraction of core inventory, 0.508 - 2.008 hours: Gases - Xe, Kr - 0.63 /hr (0.95 total)  
Elemental I - 8.1E-3 /hr (1.2E-2 total)  
Organic I - 2.5E-4 /hr (3.8E-4 total)Aerosols - I, Br - 0.158 /hr (0.2375 total)  
Cs, Rb - 0.133 /hr (0.2 total)  
Te Group - 0.033 /hr (0.05 total)  
Ba, Sr - 0.013 /hr (0.02 total)  
Noble Met - 1.7E-3 /hr (2.5E-3 tot)  
La Group - 1.3E-4 /hr (2E-4 tot)  
Ce Group - 3.3E-4 /hr (5E-4 tot)

2.4 Aerosol mass release rates, 30 - 1830 seconds (based on Items 1.3 and 2.2):

$$\text{I, Br} - 0.095 \text{ /hr} \times 2.04\text{E}4 / 3600 = 0.54 \text{ g/sec}$$

$$\text{Cs, Rb} - 0.1 \text{ /hr} \times 2.74\text{E}5 / 3600 = 7.6 \text{ g/sec}$$

Inert material assumed equal to sum = 8.14 g/sec (conservatively\* low based on Reference 4)

$$\text{Total} = 16.3 \text{ g/sec}$$

2.5 Aerosol mass release rates, 1830 - 7230 seconds (based on Items 1.3 and 2.3):

$$\text{I, Br} - 0.158 \text{ /hr} \times 2.04\text{E}4 / 3600 = 0.90 \text{ g/sec}$$

$$\text{Cs, Rb} - 0.133 \text{ /hr} \times 2.74\text{E}5 / 3600 = 10.1 \text{ g/sec}$$

$$\text{Te Group} - 0.033 \text{ /hr} \times 4.34\text{E}4 / 3600 = 0.40 \text{ g/sec}$$

$$\text{Ba, Sr} - 0.013 \text{ /hr} \times 2.01\text{E}5 / 3600 = 0.73 \text{ g/sec}$$

$$\text{Noble Metals} - 1.7\text{E}-3 \text{ /hr} \times 6.66\text{E}5 / 3600 = 0.31 \text{ g/sec}$$

$$\text{La Group} - 1.3\text{E}-4 \text{ /hr} \times 9.6\text{E}5 / 3600 = 0.035 \text{ g/sec}$$

$$\text{Ce Group} - 3.3\text{E}-4 \text{ /hr} \times 1.03\text{E}6 / 3600 = 0.094 \text{ g/sec}$$

Inert material assumed equal to sum = 12.6 g/sec (conservatively\* low based on Reference 4)

$$\text{Total} = 25.2 \text{ g/sec}$$

\* Total inert release prorated - conservative for maximizing airborne activity in second phase

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### 3. Volumes and Volumetric Flowrates

- 3.1 Volume of Drywell - 180000 ft<sup>3</sup> (Reference 5, 5.2)
- 3.2 Total Volume of Wetwell/Torus (including Pool) - 210000 ft<sup>3</sup> (Reference 5, 5.2)
- 3.3 Min/Max Volume of Suppression Pool - 92000 ft<sup>3</sup> (max) (Reference 5, 3.5.A.1)  
- 82000 ft<sup>3</sup> (min)
- 3.4 Volume of Reactor Building - 1.8E6 ft<sup>3</sup>\* (Reference 6, Tbl 6.2-11, Reference 7, and Reference 26)  
\*No hold-up to be assumed for DBA-LOCA immersion and inhalation dose calculation
- 3.5 Volume of Control Room (CR) - 27500 ft<sup>3</sup> (Reference 6, Section 6.4, and Ref 8)
- 3.6 Volume of Steamline between MSIVs - 32.4 ft<sup>3</sup> (Reference 9)  
(based on 12.77' stem-to-stem, 24" steam line, assumed Sch 80 wall =  $(12.77')\pi(21.56")^2/4/144$ )
- 3.7 Volumetric Flowrate, Drywell to Wetwell: (Reference, Calc PSAT 05201H.01, Rev 0)  
From t=0 to t=1.129 hours - 0  
From t=1.129 to t=1.296 hours - 9180 cfm  
From t=1.296 to t=2.008 hours - 0  
From t=2.008 hours to end of problem - 3E4 cfm (assumed to be well-mixed @ 10 dw vol/hr)
- 3.8 Volumetric Flowrate, Wetwell to Drywell: (Reference, Calc PSAT 05201H.01, Rev 0)  
From t=0 to t=1.296 hours - 0  
From t=1.296 to t=1.463 hours - 9180 cfm  
From t=1.463 to t=2.008 hours - 0  
From t=2.008 hours to end of problem - 3E4 cfm (assumed to be well-mixed @ 10 dw vol/hr)
- 3.9 Volumetric Flowrate, RB to Environment- 2600 cfm (Reference 6, Tbl 6.2-11, and Reference 7)
- 3.10 Drywell Sprays - One Loop, One Pump/Loop - 3000 gpm (Reference 6, Tbl 6.2-3)
- 3.11 Flow through one 1-7G25 Spraying Systems Co. Nozzle @ 40 psid - 34 gpm (Reference 6, Tbl 6.2-8)
- 3.12 Volumetric Flowrate, ESF Leakage: (Reference 1)  
From t=0 to t=720 hours - 60 gph
- 3.13 Volumetric Flowrate, Environment to CR (Unfiltered): (Reference 6, Section 6.4 and Reference 10, Section 5.3)  
From t=0 to t=720 hours - 14000 cfm

3.14 RB Bypass Volumetric Flowrates (cfm) (\* hours): (Reference – Calc PSAT 05201H.02, Rev 1)

Up to t*	MSIV 1	MSIV 2	SL Out	2" N2	ICV	TB	RB(DW)	RB(WW)
0.236	0.1204	0.0946	0.1700	0.0980	0.0150	0.0450	0.0301	0.1317
0.394	0.0456	0.0324	0.0588	0.0370	0.0064	0.0166	0.0114	0.0498
0.442	0.0741	0.0528	0.0950	0.0600	0.0090	0.0280	0.0185	0.0811
0.585	0.0456	0.0324	0.0588	0.0370	0.0064	0.0166	0.0114	0.0498
0.819	0.0741	0.0528	0.0950	0.0600	0.0090	0.0280	0.0185	0.0811
1.129	0.0456	0.0324	0.0588	0.0370	0.0064	0.0166	0.0114	0.0498
1.379	0.1091	0.0801	0.1440	0.0890	0.0140	0.0410	0.0273	0.1194
2.008	0.0571	0.0405	0.0730	0.0460	0.0070	0.0210	0.0143	0.0625
3.778	0.0516	0.0366	0.0664	0.0421	0.0066	0.0199	0.0128	0.0564
4	0.0595	0.0423	0.0764	0.0480	0.0076	0.0218	0.0148	0.0651
5.222	0.0747	0.0532	0.0960	0.0610	0.0090	0.0280	0.0187	0.0817
5.556	0.0460	0.0327	0.0594	0.0374	0.0055	0.0176	0.0116	0.0504
7.844	0.0458	0.0325	0.0591	0.0378	0.0059	0.0177	0.0115	0.0501
8	0.0566	0.0402	0.0724	0.0461	0.0077	0.0208	0.0141	0.0619
14	0.0718	0.0511	0.0920	0.0580	0.0090	0.0270	0.0180	0.0786
24	0.0818	0.0585	0.1050	0.0660	0.0100	0.0310	0.0204	0.0895
720	0.0459	0.0326	0.0588	0.0370	0.0064	0.0179	0.0115	0.0503

"MSIV1" = one valve from DW, "MSIV2" = first valve into closed SL, "SL Out" = out of closed SL, "2"N2" = for deposition in 2"N2 line, "ICV" = for deposition in ICV line, "TB" = DW to TB, "RB(DW)" = DW to East wall of RB, "RB(WW)" = WW to East wall of RB.

3.15 Primary Containment to RB Volumetric Flowrates (cfm):

(Reference – Calc PSAT 05201H.02, Rev 1)

Up to t hours	DW to RB	WW to RB	Up to t hours	DW to RB	WW to RB	Up to t hours	DW to RB	WW to RB
0.236	0.96	0.76	1.38	0.99	0.77	7.84	1.14	0.84
0.394	1.14	0.84	2.01	1.12	0.83	8	1.12	0.83
0.442	1.08	0.81	3.78	1.13	0.83	14	1.08	0.81
0.585	1.14	0.84	4.00	1.11	0.82	24	1.06	0.80
0.819	1.08	0.81	5.22	1.08	0.81	720	0.52	0.39
1.129	1.14	0.84	5.56	1.14	0.84			

Note based on Reference 27: The flowrates identified in Item 3.14 (complementary to those of Item 3.15) are used to calculate the removal lambdas and removal efficiencies for the MSIV leakage and other bypass pathways. However, for conservatism, the maximum flowrates of Item 3.14 (those for t ≤ 0.236 hours) and the corresponding value from Item 3.15 are used for calculating dose up to 24 hours (with one half of those values being used for t > 24 hours). The steam line lambdas (Item 4.4) are less than what they would have been had they been calculated using only MSIV 2 = 0.0946 cfm.

## 3.16 Design Basis Leakrates:

Primary containment:	1 %/day	(Reference 5, Pg 4.5-11)
MSIV (V-1-0007 to -0010):	15.975 scfh @ 35 psig	( Reference 11 )
Instr Air (V-6-0393 and V-6-0395):	2 scfh @ 35 psig	( " )
Iso Cond Vent (V-14-0001/-0005 and V-14-0019/-0020)	1 scfh (typ of 2) @ 35 psig	( " )
2"N <sub>2</sub> /8"N <sub>2</sub> (V-23-0014, V-23-0018, and V-27-0004)	3 scfh @ 35 psig	( " )
2"N <sub>2</sub> /8"N <sub>2</sub> (V-23-0016, V-23-0020, V-26-0016, and V-26-0018)	10 scfh @ 35 psig	( " )
8"N <sub>2</sub> V-23-0013	1 scfh @ 35 psig	( " )
8"N <sub>2</sub> V-23-0015	7.5 scfh @ 35 psig	( " )
2"N <sub>2</sub> V-23-0017	1.5 scfh @ 35 psig	( " )
2"N <sub>2</sub> V-23-0019	0.5 scfh @ 35 psig	( " )
TIP Purge V-23-0070	0.05 scfh @ 35 psig	( " )

3.17 Multiplier on RB bypass to TB to account for spray test line - 1.5 (Reference – 3/6/97 Mtg @ Oyster Creek)

**4. Filter Efficiencies, Removal Lambdas, and Decontamination Factors**

4.1 Filter Efficiency - SGTS: (Reference 6, Pg 6.5-9)

- For All Iodines Except Particulate - 90%
- For Particulates - 90% (conservative for particulates, especially for particulate iodine)
- For Noble Gas - 0%

4.2 Removal (Spray + Sedimentation) Lambdas in Drywell: (Ref – Calc PSAT 05201H.03, Rev 1)

For All Particulates and Elemental Iodine:

- From t=0 to t=0.166 hours - 0.19 /hour
- From t=0.166 to t=0.371 hours - 29.1 /hour
- From t=0.371 to t=0.414 hours - 0.14 /hour
- From t=0.414 to t=0.465 hours - 31.7 /hour
- From t=0.465 to t=0.702 hours - 0.27 /hour
- From t=0.702 to t=0.934 hours - 43.1 /hour
- From t=0.934 to t=1.129 hours - 0.32 /hour
- From t=1.129 to t=1.294 hours - 47.8 /hour
- From t=1.294 to t=1.434 hours - 38.3 /hour
- From t=1.434 to t=1.5 hours - 22.1 /hour
- From t=1.5 to t=1.57 hours - 18.8 /hour
- From t=1.57 to t=1.657 hours - 17.4 /hour
- From t=1.657 to t=1.754 hours - 16.7 /hour
- From t=1.754 to t=2.007 hours - 16.5 /hour
- From t=2.007 to t=2.339 hours - 5.62 /hour

- From t=2.339 to t=3.775 hours - 6.4 /hour
- From t=3.775 to t=4.633 hours - 0.06 /hour
- From t=4.633 to t=5.933 hours - 2.36 /hour
- From t=5.933 to t=6.353 hours - 3.48 /hour
- From t=6.353 to t=6.804 hours - 4.49 /hour
- From t=6.804 to t=7.244 hours - 5.49 /hour
- From t=7.244 to t=7.675 hours - 6.49 /hour
- From t=7.675 to t=7.791 hours - 7.44 /hour
- From t=7.791 to t=24 hours - 0.2 /hour
- From t=24 hours to end - 0 /hour

For Organic Iodine and Noble Gas:

- From t=0 to end - 0/hour

4.3 (Deleted)

4.4 Removal (Sedimentation) Lambdas in Closed Steamline: (Ref – Calc PSAT 05201H.03, Rev 1)

For All Particulates:

- From t=0 to t=0.512 hours – 1.36 /hour
- From t=0.512 to t=1.009 hours – 2.54 /hour
- From t=1.009 to t=2.239 hours – 2.41 /hour
- From t=2.239 to t=2.803 hours – 2.59 /hour
- From t=2.803 to t=3.088 hours – 2.11 /hour
- From t=3.088 to t=5.041 hours – 1.39 /hour
- From t=5.041 to t=9.871 hours – 0.66 /hour
- From t=9.871 to t=14.12 hours – 0.4 /hour
- From t=14.12 to t=24 hours – 0.37 /hour
- From t=24 hours to end – 0 /hour

For Elemental and Organic Iodine and Noble Gas:

- From t=0 to end – 0/hour

4.5 Filter Efficiency for MSIV1 (in Line with One MSIV Failed Open) (Reference 12)

For All Particulates and Elemental Iodine (assumed adsorbed on particulate): 50%

For Organic Iodine and Noble Gas: 0%

4.6 Filter Efficiency for MSIV2 (Closed Steamline)

- For All Particulates: 0% (see Item 4.4)
- For Elemental Iodine: 50%  
(assumed adsorbed on particulate but 50% re-evolved - see Reference 13 where elemental iodine surface fixation rate is observed to equal or bound corresponding resuspension rate between 300 and 560 K)
- For Organic Iodine and Noble Gas: 0%

4.7 Filter Efficiency for Other Bypass Leakpaths

For 2"N<sub>2</sub>/8"N<sub>2</sub> (i.e., Releases from East Wall of RB):

- For All Particulates: 91.6% (References – Calc PSAT 05201H.04, Rev 0 and Calc PSAT 05201H.02, Rev 1)
- For Elemental Iodine: 50%  
(assumed adsorbed on particulate but 50% re-evolved - see Reference 13 where elemental iodine surface fixation rate is observed to equal or bound corresponding resuspension rate between 300 and 560 K)
- For Organic Iodine and Noble Gas: 0%

For Iso Cond Vent/ Instr Air/DW Spray Test (i.e., Releases for TB):

- For All Particulates: 96.5% (References – Calc PSAT 05201H.04, Rev 0 and Calc PSAT 05201H.02, Rev 1)
- For Elemental Iodine: 50%  
(assumed adsorbed on particulate but 50% re-evolved - see Reference 13 where elemental iodine surface fixation rate is observed to equal or bound corresponding resuspension rate between 300 and 560 K)
- For Organic Iodine and Noble Gas: 0%

4.8 (Deleted)

4.9 Release Fraction of Radioiodine in ESF Leakage - 0.1 (Reference 14)

4.10 (Deleted)

**5. X/Q Values, Breathing Rates, and Occupancy Factors**

5.1 CR X/Q (sec/m <sup>3</sup> ):	<u>Stack</u>	<u>Yard</u>	<u>TB</u>
From t=0 to t=8 hours	1.80E-4	2.59E-3	2.71E-3
From t=8 to t=24 hours	9.67E-5	1.15E-3	8.76E-4
From t=24 to t=96 hours	2.50E-5	8.44E-4	8.63E-4
From t=96 to t=720 hours	3.60E-6	7.18E-4	8.45E-4

(Reference 1 for Stack, Reference 25 for Yard and TB)

5.2 Breathing rates:	(Reference 15 for CR, Reference 16 and Reference 6, Pg 5.6-9 for other)
0 - 8 hours	3.47E-4 m <sup>3</sup> /sec (used in CR for 0 - 720 hours)
8 - 24 hours	1.75E-4 m <sup>3</sup> /sec
24 - 720 hours	2.32E-4 m <sup>3</sup> /sec

5.3 CR Occupancy Factors:	(Reference 28)
From t = 0 to t = 1 day	1.0
From t = 1 day to t = 30 days	0.25 (effective value for 18 8-hr shifts over 720 hrs + 25%)

5.4 Offsite X/Q (sec/m <sup>3</sup> )	<u>EAB-Elev</u>	<u>EAB-Grnd</u>	<u>LPZ-Elev</u>	<u>LPZ-Grnd</u>
Worst 2 (EAB)/4 (LPZ) hrs	1.07E-4	1.41E-3	1.68E-5	1.35E-4
Remainder of first 8 hours			8.88E-7	6.23E-5
From t=8 to t=24 hours			6.19E-7	4.23E-5

From t=24 to t=96 hours  
From t=96 to t=720 hours

2.83E-7  
9.16E-8

1.82E-5  
5.43E-6

(Reference 26)

**6. Chemistry Data**

6.1 Initial Pool pH - 6.23 (Reference - Calc PSAT 05201H.10, Rev 0)

6.2 Water Volume in Containment (including RCS):

82000 ft<sup>3</sup> minimum in the suppression pool + 7600 ft<sup>3</sup> for the RCS = 89600 ft<sup>3</sup>

(Note that this does not include all possible in-containment water which is conservative for iodine concentration effect: pH not greatly sensitive) (See Item 3.1 and Reference 6, Pg 6.2-7)

6.3 Mass of Chloride-Bearing Electrical Insulation inside Containment - see Calc PSAT 05201H.05, Rev 2)

6.4 Use of Organic Coatings in Containment

None (Drywell)

(Reference 22)

Mobil 78 coating applied 1983/1984 (Torus)

(References 22/23)

6.5 Minimum Suppression Pool pH Values:

(Reference - Calc PSAT 05201H.05, Rev 2)

First 21 days (not including pre-release conditions): >8.0

21 to 30 days: >7.9

**7. Fission Product Transport Data**

7.1 Suppression Pool Bypass Area - 10.5 in<sup>2</sup> (Reference 5, Pg 4.5-12)

7.2 DW Dimensions:

(Reference 6, Pg 6.2-2, except as noted)

Diameter of Sphere = 70'

Diameter of Cylindrical Extension = 33'

Height of Extension = 23'

Average DW Shell Thickness = Approx 1"

(Reference 18)

7.3 Torus Dimensions:

(Reference 6, Pg 6.2-2)

Major Diameter = 101'

Minor Diameter = 30'

7.4 RB Bypass Pathway Horizontal Lengths and Diameters

(Reference 19)

2"N<sub>2</sub> Length: 3' + 2' + 10' + 4' + 20' + 20' + 40' + 38' + 40' + 12' + 13' + 4' + 34' = 240'

2"N<sub>2</sub> Diameter: 2" nominal

8"N<sub>2</sub> Length: 10' + 20' + 1' + 40' + 38' + 40' + 25' + 2' + 34' = 210'

8"N<sub>2</sub> Diameter: 8" nominal

TIP Purge Length:  $25' + 80' + 10' + 25' + 1' = 141'$   
 TIP Purge Diameter: 1/2" nominal

Iso Cond Vents (Common Part Only) Length:  $12.5' + 24.25' + 0.5' + 1.25' + 18' + 20.5' + 1' + 15.33' + 9.5' + 21.67' + 63.5' + 2.5' + 1' + 2.33' + 6' + 0.33' + 4.75' = 205'$

Iso Cond Vents (Common Part Only) Diameter: 3/4" nominal

Instr Air Length - 2" Dia Part:  $15' + 2' + 1' + 10' + 10' + 1' + 10' + 30' = 79'$   
 - 2.5" Dia Part:  $4' + 2' = 6'$   
 - 4" Dia Part:  $47' + 22' = 69'$                       Total = 154'

Instr Air Diameter:  $\{[(2")^2(79') + (2.5")^2(6') + (4")^2(69')]/154\}^{1/2} = 3"$  effective

7.5 RB Bypass Pathway Minimum Plug-Flow Residence Times (Ref – Calc PSAT 05201H.02, Rev 0)

- 2"N<sub>2</sub> - 92.8 minutes
- 8"N<sub>2</sub> - 2472 minutes
- Iso Cond Vent - 74.8 minutes
- Instrument Air - 946.8 minutes

7.6 (Deleted)

8. Thermal-Hydraulic Data

8.1 STARNAUA input

(Reference PSAT 05201H.01)

t (NAUA) seconds*	Cond Rate g/sec	Spray Rate/Temp g/sec      deg C	DW Temp/R/H/Press			Leak %/day
			deg C	%	atmospheres	
0	9090	0      n/a	182	20	2.834467	0
270	0	0      n/a	162	45	2.785172	0
570	0	1.90E+05      30	150	60	2.730947	0
610	0	1.90E+05      30	130	100	2.60278	0
1315	0	0      29	42	100	1.040126	0
1465	0	1.90E+05      29	102	10	1.2028	0
1650	0	0      29	42	100	1.040126	0
2500	0	1.90E+05      28	102	10	1.2028	0
3340	0	0      28	42	100	1.040126	0
4035	0	1.90E+05      28	102	10	1.2028	7344
4635	0	1.90E+05      29	99	100	1.676033	0
5235	0	1.90E+05      30	40	100	1.109139	0
7200	0	1.90E+05      29	40	100	1.109139	0
13570	0	0      27	29	100	1.040126	0
14370	0	0      n/a	82	8	1.183082	0
18770	0	1.90E+05      29	92	5	1.2028	0
18970	0	1.90E+05      29	32	100	1.054915	0
19970	0	1.90E+05      29	29	100	1.054915	0
28210	0	0      24	27	100	1.040126	0

28770	0	0	n/a	69	15	1.153505	0
50370	0	0	n/a	92	3	1.2028	0
86370	0	0	n/a	130	1	1.281672	0

\* NAUA t=0 is actually t=30 seconds (since STARNAUA analysis begins with gap release)

8.2 Maximum Suppression Pool Temperature - 140 F @ 1 hour, 105 F @ 24 hours  
(for T<sub>initial</sub> = 90 F) (Reference 6, Fig 6.2-5)

8.3 Maximum Spray HX Cooling Water Temperature - 85 F (Reference 6, Tbl 6.2-7)

8.4 Time for MSIV Leakage to Reach the Point of Release from the Drywell Source –  
8.7 hours for MSIV 1  
13 hours for MSIV2  
(Reference 27)

**9. System-Related Data (Other than Volumetric Flows)**

9.1 Spray Fall Height in Drywell - 826 cm (approx 27'1") (Reference 24)

9.2 Spray Nozzle Characteristics: (Reference 6, Tbl 6.2-8, except as noted)

- Type: 1-7G25
- Number on Upper DW Header: 32 per each of two
- Number on Lower DW Header: 56 per each of two
- Number on Torus Header: 10 total (shared header) (Reference 6, Pg 6.2-23)
- Torus Header Elev = 10'2" (Reference 6, Pg 6.2-23)
- Mass Median Droplet Size @ 40 psid = 2600 μm (Reference 20)
- 16<sup>th</sup> Percentile Droplet Size @ 40 psid = 1500 μm (Reference 20)
- 84<sup>th</sup> Percentile Droplet Size @ 40 psid = 4100 μm (Reference 20)

9.3 Spray Trip DW Pressure - 0.6 psig (Reference 6, Pg 6.2-23)

9.4 Minimum Vent Submergence - 3 ft (Reference 6, Pg 6.2-2)

9.5 Normal Operating Steam Dome Pressure - 1035 psia (Reference 6, Tbl 15.6-1)

9.6 Midplane Elevation of the Torus - (-)2'6" (Reference 18)

9.7 Nominal Suppression Pool Depth - 12' (Reference 6, Pg 6.2-2)



**References**

1. Enclosure to June 17, 1985 Letter, Wilson (GPUN) to Zwolinski (NRC)
2. GPUN Calc C-1302-226-E620-369, "Oyster Creek Source Terms for Two Year Cycles" by R.V. Furia, 12/6/96
3. TACT5 User's Manual, File MLWRICRP.30
4. NUREG-1465
5. Oyster Creek Technical Specifications
6. Oyster Creek UFSAR
7. Oyster Creek Post-Accident Shielding Study, June 1985 (CMT # 171570)
8. GPUN Calc C-1302-411-5310-057
9. Oyster Creek Dwg JCP-19442
10. TDR 893, "Control Room Habitability", April 1988
11. "Primary Containment Leakage Rate Testing Program", Revision 0, October 1996 (CMT # 171570)
12. Morewitz, "Leakage of Aerosols from Containment Buildings", Health Physics Vol. 42, No. 2, February 1982
13. Cline, "MSIV Leakage Iodine Transport Analysis", prepared for USNRC under Contract NRC-03-87-029, Task Order 75, March 26, 1991
14. SRP 15.6.5
15. Murphy-Campe (cited in SRP 6.4)
16. Regulatory Guide 1.3
17. GPUN Calc C-1302-212-5340-099
18. Oyster Creek Dwg CB&I 9-0971
19. Letter with Attachments, Radvansky (GPUN) to Metcalf (Polestar), dated January 20, 1997 (CMT # 171570)
20. Spraying Systems Dwg 12135-5
21. Deleted
22. Email, Radvansky (GPUN) to Metcalf (Polestar), Subject: "Drywell Coating Information", 1/28/97
23. Fax, Radvansky (GPUN) to Metcalf (Polestar), 3/27/96
24. GPUN Calc C-1302-241-E540-077, Rev 0
25. GPUN Calc C-1302-826-E540-017, Rev 0 per email from A Baig (Amergen) to J. Metcalf (Polestar) dated 08/10/00
26. Email, Mscisz (Exelon) to Metcalf, Sher, and Pustulka (Polestar), Subject: "Oyster Creek X/Qs", 3/9/07

- 27. Email, Mscisz (Exelon) to Metcalf (Polestar), Subject: "Oyster Creek AST Database", 3/20/07
- 28. Email, Mscisz (Exelon) to Metcalf (Polestar), Subject: "Re: Occupancy Factor", 3/21/07

David Leaver

**From:** thomas.mscisz@exeloncorp.com  
**Sent:** Tuesday, March 20, 2007 8:43 AM  
**To:** jmetcalf@polestar.com  
**Cc:** dewl@polestar.com; hpustulka@polestar.com; gdyer@polestar.com  
**Subject:** RE: Oyster Creek AST Database  
**Attachments:** 012005 U.03 Rev5 - Final Review Draft.doc

im,

the attached Oyster Creek AST Database is acceptable for use.

Tom Mscisz  
Exelon Nuclear  
610-765-5971

-----Original Message-----

**From:** Jim Metcalf [mailto:jmetcalf@polestar.com]  
**Sent:** Tuesday, March 20, 2007 11:16 AM  
**To:** Mscisz, Thomas J  
**Cc:** dewl@polestar.com; hpustulka@polestar.com; gdyer@polestar.com  
**Subject:** Re: Oyster Creek AST Database

Thank you, Tom. With these data incorporated (as on the attached) is the review draft of Revision 5 acceptable to Exelon? Please let Dave Leaver and I know.

Jim

At 10:13 AM 3/20/2007, you wrote:

Jim,

Regarding the Oyster Creek AST Database:

1. Use a post-24 hour occupancy factor of 0.2. This is based on 18 8-hour shifts over 720 hours.
2. The time for MSIV leakage to reach the point of release from the drywell source is 8.7 hours for MSIV 1 and 13 hours for MSIV 2. This is based on the previous calculation #1505-MR IV-002, Revision 0 (5/8/85).
3. Instead of using the pressure dependent leakage values, use the maximum Technical Specification leakage for the first 24 hours and then 50% of these values for the remainder of the accident. This is for MSIV leakage as well as for all other bypass pathways.
4. To clarify the reference #26, the X/Q data was taken from Calculation C-1302-826-826-E310-018, Revision 2.

Tom Mscisz  
Exelon Nuclear  
610-765-5971

\*\*\*\*\*

This e-mail and any of its attachments may contain Exelon

ASAT 05201 H.08 Rev 3  
Attachment D

Page 1b of 16

X-Sieve: CMU Sieve 2.2  
Subject: RE: Acceptance of database R6  
Date: Thu, 22 Mar 2007 12:49:12 -0400  
X-MS-Has-Attach:  
X-MS-TNEF-Correlator:  
Thread-Topic: Acceptance of database R6  
Thread-index: AcdsoPGLtZdm7jaDQ0+bCHLamZtjKAAAPXZA  
From: <thomas.mscisz@exeloncorp.com>  
To: <jmetcalf@polestar.com>  
Cc: <dewl@polestar.com>,  
<gdyer@polestar.com>,  
<hpustulka@polestar.com>,  
<mberg@polestar.com>  
X-OriginalArrivalTime: 22 Mar 2007 16:49:12.0611 (UTC) FILETIME=[04E72F30:01C76CA2]  
X-Virus-Scanned: by amavisd-new at polestar.com

Jim,

The database changes indicated for Oyster Creek AST are acceptable for use.

Tom Mscisz

-----Original Message-----

From: Jim Metcalf [<mailto:jmetcalf@polestar.com>]  
Sent: Thursday, March 22, 2007 12:40 PM  
To: Mscisz, Thomas J  
Cc: dewl@polestar.com; gdyer@polestar.com; hpustulka@polestar.com;  
mberg@polestar.com  
Subject: Acceptance of database R6

Tom -

Please indicate your acceptance of the attached database for OC. We have changed the post-24 hour OF to 0.25 per your e-mail.

Jim

-----  
\*\*\*\*\*

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\*\*\*\*\*

**Attachment 1.1: BASE Library File**

n_isotopes 76 n_isotope_groups 11														
Kr83m	N_Gas	NONE	NONE	4.15E+03	1.04E-04	0	1.49E-05	0	0	0	0	0	0	0
Kr85m	N_Gas	NONE	NONE	6.94E+03	4.39E-05	0	2.77E-02	0	0.05	0	0.22	0	0	0
Kr85	N_Gas	NONE	NONE	4.03E+02	2.04E-09	0	4.40E-04	0	0.05	0	0.22	0	0	0
Kr87	N_Gas	NONE	NONE	1.29E+04	1.52E-04	0	1.52E-01	0	0.34	0	1.48	0	0	0
Kr88	N_Gas	NONE	NONE	1.83E+04	6.88E-05	0	3.77E-01	0	0.08	0	0.35	0	0	0
Kr89	N_Gas	NONE	NONE	3.98E+04	3.63E-03	0	3.23E-01	0	0.35	0	1.52	0	0	0
Xe131m	N_Gas	NONE	NONE	2.60E+02	6.68E-07	0	1.49E-03	0	0.02	0	0.04	0	0	0
Xe133m	N_Gas	NONE	NONE	1.38E+03	3.49E-06	0	5.07E-03	0	0.03	0	0.13	0	0	0
Xe133	N_Gas	I133Part	NONE	5.23E+04	1.52E-06	0	5.77E-03	0	0.01	0	0.04	0	0	0
Xe135m	N_Gas	NONE	NONE	1.56E+04	7.40E-04	0	7.55E-02	0	0.02	0	0.09	0	0	0
Xe135	N_Gas	I135Part	NONE	1.81E+04	2.09E-05	0	4.40E-02	0	0.06	0	0.26	0	0	0
Xe137	N_Gas	NONE	NONE	5.10E+04	2.96E-03	0	3.03E-02	0	0.46	0	2	0	0	0
Xe138	N_Gas	NONE	NONE	4.78E+04	6.80E-04	0	1.99E-01	0	0.15	0	0.65	0	0	0
I131Org	Org_I	NONE	NONE	2.51E+04	9.96E-07	1.08E+06	6.73E-02	0	0.03	3.29E+04	0.13	0	0	0
I132Org	Org_I	NONE	NONE	3.66E+04	8.27E-05	6.44E+03	4.14E-01	0	0.11	3.81E+02	0.48	0	0	0
I133Org	Org_I	NONE	NONE	5.18E+04	9.22E-06	1.80E+05	1.09E-01	0	0.09	5.85E+03	0.39	0	0	0
I134Org	Org_I	NONE	NONE	5.60E+04	2.23E-04	1.07E+03	4.81E-01	0	0.14	1.31E+02	0.61	0	0	0
I135Org	Org_I	NONE	NONE	4.82E+04	2.86E-05	3.13E+04	3.07E-01	0	0.08	1.23E+03	0.35	0	0	0
I131Elem	Elm_I	Te131m	NONE	2.51E+04	9.96E-07	1.08E+06	6.73E-02	0	0.03	3.29E+04	0.13	0	0	0
I132Elem	Elm_I	Te132	NONE	3.66E+04	8.27E-05	6.44E+03	4.14E-01	0	0.11	3.81E+02	0.48	0	0	0
I133Elem	Elm_I	NONE	NONE	5.18E+04	9.22E-06	1.80E+05	1.09E-01	0	0.09	5.85E+03	0.39	0	0	0
I134Elem	Elm_I	NONE	NONE	5.60E+04	2.23E-04	1.07E+03	4.81E-01	0	0.14	1.31E+02	0.61	0	0	0
I135Elem	Elm_I	NONE	NONE	4.82E+04	2.86E-05	3.13E+04	3.07E-01	0	0.08	1.23E+03	0.35	0	0	0
I131Part	Prt_I	NONE	NONE	2.51E+04	9.96E-07	1.08E+06	6.73E-02	0	0.03	3.29E+04	0.13	0	0	0
I132Part	Prt_I	NONE	NONE	3.66E+04	8.27E-05	6.44E+03	4.14E-01	0	0.11	3.81E+02	0.48	0	0	0
I133Part	Prt_I	NONE	Xe133	5.18E+04	9.22E-06	1.80E+05	1.09E-01	0	0.09	5.85E+03	0.39	0	0	0
I134Part	Prt_I	NONE	NONE	5.60E+04	2.23E-04	1.07E+03	4.81E-01	0	0.14	1.31E+02	0.61	0	0	0
I135Part	Prt_I	NONE	Xe135	4.82E+04	2.86E-05	3.13E+04	3.07E-01	0	0.08	1.23E+03	0.35	0	0	0
Rb86	CsGrp	NONE	NONE	4.03E+01	4.29E-07	4.92E+03	1.78E-02	0	0	6.62E+03	0	0	0	0
Cs134	CsGrp	NONE	NONE	4.83E+03	9.55E-09	4.11E+04	2.80E-01	0	0	4.63E+04	0	0	0	0
Cs136	CsGrp	NONE	NONE	1.39E+03	6.16E-07	6.40E+03	3.92E-01	0	0	7.33E+03	0	0	0	0
Cs137	CsGrp	NONE	Ba137m	4.56E+03	7.30E-10	2.93E+04	1.01E-01	0	0	3.19E+04	0	0	0	0
Sb127	TeGrp	NONE	Te127	2.33E+03	2.07E-06	2.28E+02	1.23E-01	0	0	6.03E+03	0	0	0	0
Sb129	TeGrp	NONE	Te129	8.03E+03	4.42E-05	3.60E+01	2.64E-01	0	0	6.44E+02	0	0	0	0
Te127m	TeGrp	NONE	NONE	3.12E+02	7.64E-08	3.57E+02	5.44E-04	0	0	2.15E+04	0	0	0	0
Te127	TeGrp	Sb127	NONE	2.32E+03	2.06E-05	6.81E+00	8.95E-04	0	0	3.18E+02	0	0	0	0
Te129m	TeGrp	NONE	NONE	1.21E+03	2.36E-07	5.78E+02	1.23E-02	0	0	2.40E+04	0	0	0	0
Te129	TeGrp	Sb129	NONE	7.93E+03	1.57E-04	1.88E+00	1.02E-02	0	0	7.73E+01	0	0	0	0
Te131m	TeGrp	NONE	I131Elem	3.77E+03	6.42E-06	1.36E+05	2.76E-01	0	0	6.50E+03	0	0	0	0
Te132	TeGrp	NONE	I132Elem	3.60E+04	2.51E-06	2.32E+05	3.81E-02	0	0	9.44E+03	0	0	0	0
Ba137m	BaGrp	Cs137	NONE	1.81E+03	4.53E-03	0	0	0	0	0	0	0	0	0
Ba139	BaGrp	NONE	NONE	4.61E+04	1.39E-04	8.88E+00	8.03E-03	0	0	1.72E+02	0	0	0	0
Ba140	BaGrp	NONE	La140	4.51E+04	6.27E-07	9.47E+02	3.17E-02	0	0	3.74E+03	0	0	0	0

Mo99	NMtls	NONE	Tc99m	4.70E+042.87E-06	5.62E+012.69E-02	0	0	3.96E+030	0	0	0	0	0
Tc99m	NMtls	Mo99	NONE	4.11E+043.18E-05	1.85E+022.18E-02	0	0	3.26E+010	0	0	0	0	0
Ru103	NMtls	NONE	NONE	3.98E+042.03E-07	9.51E+028.33E-02	0	0	8.96E+030	0	0	0	0	0
Ru105	NMtls	NONE	Rh105	2.57E+044.22E-05	1.54E+011.41E-01	0	0	4.55E+020	0	0	0	0	0
Ru106	NMtls	NONE	NONE	1.41E+042.20E-08	6.36E+033.85E-02	0	0	4.77E+050	0	0	0	0	0
Rh105	NMtls	Ru105	NONE	2.49E+045.40E-06	1.07E+011.38E-02	0	0	9.55E+020	0	0	0	0	0
Y90	LaGrp	Sr90	NONE	3.42E+032.99E-06	1.91E+007.03E-04	0	0	8.44E+030	0	0	0	0	0
Y91	LaGrp	Sr91	NONE	3.27E+041.38E-07	3.15E+019.62E-04	0	0	4.88E+040	0	0	0	0	0
Y92	LaGrp	Sr92	NONE	3.37E+045.35E-05	3.89E+004.81E-02	0	0	7.81E+020	0	0	0	0	0
Y93	LaGrp	NONE	NONE	3.87E+041.91E-05	3.43E+001.78E-02	0	0	2.15E+030	0	0	0	0	0
Zr95	LaGrp	NONE	Nb95	4.42E+041.27E-07	5.33E+031.33E-01	0	0	2.36E+040	0	0	0	0	0
Zr97	LaGrp	NONE	NONE	4.37E+041.13E-05	8.57E+011.64E-01	0	0	4.33E+030	0	0	0	0	0
Nb95	LaGrp	Zr95	NONE	4.46E+042.29E-07	1.32E+031.38E-01	0	0	5.81E+030	0	0	0	0	0
La140	LaGrp	Ba140	NONE	4.63E+044.77E-06	2.54E+024.33E-01	0	0	4.85E+030	0	0	0	0	0
La141	LaGrp	NONE	Ce141	4.26E+044.94E-05	3.48E+018.84E-03	0	0	8.44E+020	0	0	0	0	0
La142	LaGrp	NONE	NONE	4.12E+041.26E-04	3.23E+015.33E-01	0	0	2.53E+020	0	0	0	0	0
Pr143	LaGrp	Ce143	NONE	3.97E+045.85E-07	6.22E-06	7.77E-05	0	0	8.10E+030	0	0	0	0
Nd147	LaGrp	NONE	NONE	1.68E+047.10E-07	6.73E+012.29E-02	0	0	6.85E+030	0	0	0	0	0
Am241	LaGrp	NONE	NONE	8.50E+004.80E-11	5.92E+033.03E-03	0	0	4.44E+080	0	0	0	0	0
Cm242	LaGrp	NONE	NONE	1.78E+034.94E-08	3.48E+032.11E-05	0	0	1.73E+070	0	0	0	0	0
Cm244	LaGrp	NONE	NONE	7.10E+011.25E-09	3.74E+031.82E-05	0	0	2.48E+080	0	0	0	0	0
Ce141	CeGrp	La141	NONE	4.31E+042.51E-07	9.44E+011.27E-02	0	0	8.95E+030	0	0	0	0	0
Ce143	CeGrp	NONE	Pr143	3.98E+046.03E-06	2.31E+014.77E-02	0	0	3.39E+030	0	0	0	0	0
Ce144	CeGrp	NONE	NONE	3.48E+042.77E-08	1.08E+031.03E-02	0	0	3.74E+050	0	0	0	0	0
Np239	CeGrp	NONE	NONE	5.07E+053.44E-06	2.82E+012.85E-02	0	0	2.51E+030	0	0	0	0	0
Pu238	CeGrp	NONE	NONE	1.04E+022.40E-10	1.43E+031.81E-05	0	0	2.88E+080	0	0	0	0	0
Pu239	CeGrp	NONE	NONE	1.43E+019.00E-13	1.39E+031.57E-05	0	0	3.08E+080	0	0	0	0	0
Pu240	CeGrp	NONE	NONE	2.10E+013.30E-12	1.39E+031.76E-05	0	0	3.08E+080	0	0	0	0	0
Pu241	CeGrp	NONE	NONE	4.99E+031.67E-09	3.39E+012.68E-07	0	0	4.96E+060	0	0	0	0	0
Sr89	SrGrp	NONE	NONE	2.54E+041.59E-07	2.95E+012.86E-04	0	0	6.51E+030	0	0	0	0	0
Sr90	SrGrp	NONE	Y90	3.33E+038.00E-10	9.95E+022.79E-05	0	0	2.39E+050	0	0	0	0	0
Sr91	SrGrp	NONE	Y91	3.15E+042.01E-05	3.67E+011.82E-01	0	0	9.32E+020	0	0	0	0	0
Sr92	SrGrp	NONE	Y92	3.35E+047.29E-05	1.45E+012.51E-01	0	0	6.29E+020	0	0	0	0	0



Ba139	BaGrp	NONE	NONE	5.93E+02	1.39E-04	8.88E+00	8.03E-03	0	0	1.72E+020	0	0	0	0	0
Ba140	BaGrp	NONE	La140	4.42E+04	6.27E-07	9.47E+02	3.17E-02	0	0	3.74E+030	0	0	0	0	0
Mo99	NMtls	NONE	Tc99m	4.30E+04	2.87E-06	5.62E+01	2.69E-02	0	0	3.96E+030	0	0	0	0	0
Tc99m	NMtls	Mo99	NONE	4.33E+04	3.18E-05	1.85E+02	2.18E-02	0	0	3.26E+010	0	0	0	0	0
Ru103	NMtls	NONE	NONE	3.96E+04	2.03E-07	9.51E+02	8.33E-02	0	0	8.96E+030	0	0	0	0	0
Ru105	NMtls	NONE	Rh105	6.86E+03	4.22E-05	1.54E+01	1.41E-01	0	0	4.55E+020	0	0	0	0	0
Ru106	NMtls	NONE	NONE	1.41E+04	2.20E-08	6.36E+03	3.85E-02	0	0	4.77E+050	0	0	0	0	0
Rh105	NMtls	NONE	Ru105	2.32E+04	5.40E-06	1.07E+01	1.38E-02	0	0	9.55E+020	0	0	0	0	0
Y90	LaGrp	Sr90	NONE	3.41E+03	2.99E-06	1.91E+00	7.03E-04	0	0	8.44E+030	0	0	0	0	0
Y91	LaGrp	Sr91	NONE	3.27E+04	1.38E-07	3.15E+01	9.62E-04	0	0	4.88E+040	0	0	0	0	0
Y92	LaGrp	Sr92	NONE	1.42E+04	5.35E-05	3.89E+00	4.81E-02	0	0	7.81E+020	0	0	0	0	0
Y93	LaGrp	NONE	NONE	2.13E+04	1.91E-05	3.43E+00	1.78E-02	0	0	2.15E+030	0	0	0	0	0
Zr95	LaGrp	NONE	Nb95	4.40E+04	1.27E-07	5.33E+03	1.33E-01	0	0	2.36E+040	0	0	0	0	0
Zr97	LaGrp	NONE	NONE	3.07E+04	1.13E-05	8.57E+01	1.64E-01	0	0	4.33E+030	0	0	0	0	0
Nb95	LaGrp	Zr95	NONE	4.46E+04	2.29E-07	1.32E+03	1.38E-01	0	0	5.81E+030	0	0	0	0	0
La140	LaGrp	Ba140	NONE	4.61E+04	4.77E-06	2.54E+02	4.33E-01	0	0	4.85E+030	0	0	0	0	0
La141	LaGrp	NONE	Ce141	9.07E+03	4.94E-05	3.48E+01	8.84E-03	0	0	8.44E+020	0	0	0	0	0
La142	LaGrp	NONE	NONE	7.96E+02	1.26E-04	3.23E+01	5.33E-01	0	0	2.53E+020	0	0	0	0	0
Pr143	LaGrp	Ce143	NONE	3.96E+04	5.85E-07	6.22E-06	7.77E-05	0	0	8.10E+030	0	0	0	0	0
Nd147	LaGrp	NONE	NONE	1.64E+04	7.10E-07	6.73E+01	2.29E-02	0	0	6.85E+030	0	0	0	0	0
Am241	LaGrp	NONE	NONE	8.50E+00	4.80E-11	5.92E+03	3.03E-03	0	0	4.44E+080	0	0	0	0	0
Cm242	LaGrp	NONE	NONE	1.78E+03	4.94E-08	3.48E+03	2.11E-05	0	0	1.73E+070	0	0	0	0	0
Cm244	LaGrp	NONE	NONE	7.10E+01	1.25E-09	3.74E+03	1.82E-05	0	0	2.48E+080	0	0	0	0	0
Ce141	CeGrp	La141	NONE	4.29E+04	2.51E-07	9.44E+01	1.27E-02	0	0	8.95E+030	0	0	0	0	0
Ce143	CeGrp	NONE	Pr143	3.30E+04	6.03E-06	2.31E+01	4.77E-02	0	0	3.39E+030	0	0	0	0	0
Ce144	CeGrp	NONE	NONE	3.48E+04	2.77E-08	1.08E+03	1.03E-02	0	0	3.74E+050	0	0	0	0	0
Np239	CeGrp	NONE	NONE	4.55E+05	3.44E-06	2.82E+01	2.85E-02	0	0	2.51E+030	0	0	0	0	0
Pu238	CeGrp	NONE	NONE	1.04E+02	2.40E-10	1.43E+03	1.81E-05	0	0	2.88E+080	0	0	0	0	0
Pu239	CeGrp	NONE	NONE	1.43E+01	9.00E-13	1.39E+03	1.57E-05	0	0	3.08E+080	0	0	0	0	0
Pu240	CeGrp	NONE	NONE	2.10E+01	3.30E-12	1.39E+03	1.76E-05	0	0	3.08E+080	0	0	0	0	0
Pu241	CeGrp	NONE	NONE	4.99E+03	1.67E-09	3.39E+01	2.68E-07	0	0	4.96E+060	0	0	0	0	0
Sr89	SrGrp	NONE	NONE	2.53E+04	1.59E-07	2.95E+01	2.86E-04	0	0	6.51E+030	0	0	0	0	0
Sr90	SrGrp	NONE	Y90	3.33E+03	8.00E-10	9.95E+02	2.79E-05	0	0	2.39E+050	0	0	0	0	0
Sr91	SrGrp	NONE	Y91	1.68E+04	2.01E-05	3.67E+01	1.82E-01	0	0	9.32E+020	0	0	0	0	0
Sr92	SrGrp	NONE	Y92	3.42E+03	7.29E-05	1.45E+01	2.51E-01	0	0	6.29E+020	0	0	0	0	0



Ba137m	BaGrp	Cs137	NONE	4.56E+03	4.53E-03	0	0	0	0	0	0	0	0	0	0
Ba139	BaGrp	NONE	NONE	6.90E+01	1.39E-04	8.88E+00	8.03E-03	0	0	1.72E+02	0	0	0	0	0
Ba140	BaGrp	NONE	La140	4.38E+04	6.27E-07	9.47E+02	3.17E-02	0	0	3.74E+03	0	0	0	0	0
Mo99	NMtls	NONE	Tc99m	4.11E+04	2.87E-06	5.62E+01	2.69E-02	0	0	3.96E+03	0	0	0	0	0
Tc99m	NMtls	Mo99	NONE	4.28E+04	3.18E-05	1.85E+02	2.18E-02	0	0	3.26E+01	0	0	0	0	0
Ru103	NMtls	NONE	NONE	3.94E+04	2.03E-07	9.51E+02	8.33E-02	0	0	8.96E+03	0	0	0	0	0
Ru105	NMtls	NONE	Rh105	3.57E+03	4.22E-05	1.54E+01	1.41E-01	0	0	4.55E+02	0	0	0	0	0
Ru106	NMtls	NONE	NONE	1.41E+04	2.20E-08	6.36E+03	3.85E-02	0	0	4.77E+05	0	0	0	0	0
Rh105	NMtls	Ru105	NONE	2.17E+04	5.40E-06	1.07E+01	1.38E-02	0	0	9.55E+02	0	0	0	0	0
Y90	LaGrp	Sr90	NONE	3.41E+03	2.99E-06	1.91E+00	7.03E-04	0	0	8.44E+03	0	0	0	0	0
Y91	LaGrp	Sr91	NONE	3.26E+04	1.38E-07	3.15E+01	9.62E-04	0	0	4.88E+04	0	0	0	0	0
Y92	LaGrp	Sr92	NONE	7.26E+03	5.35E-05	3.89E+00	4.81E-02	0	0	7.81E+02	0	0	0	0	0
Y93	LaGrp	NONE	NONE	1.58E+04	1.91E-05	3.43E+00	1.78E-02	0	0	2.15E+03	0	0	0	0	0
Zr95	LaGrp	NONE	Nb95	4.39E+04	1.27E-07	5.33E+03	1.33E-01	0	0	2.36E+04	0	0	0	0	0
Zr97	LaGrp	NONE	NONE	2.58E+04	1.13E-05	8.57E+01	1.64E-01	0	0	4.33E+03	0	0	0	0	0
Nb95	LaGrp	Zr95	NONE	4.46E+04	2.29E-07	1.32E+03	1.38E-01	0	0	5.81E+03	0	0	0	0	0
La140	LaGrp	Ba140	NONE	4.59E+04	4.77E-06	2.54E+02	4.33E-01	0	0	4.85E+03	0	0	0	0	0
La141	LaGrp	NONE	Ce141	4.22E+03	4.94E-05	3.48E+01	8.84E-03	0	0	8.44E+02	0	0	0	0	0
La142	LaGrp	NONE	NONE	1.13E+02	1.26E-04	3.23E+01	5.33E-01	0	0	2.53E+02	0	0	0	0	0
Pr143	LaGrp	Ce143	NONE	3.96E+04	5.85E-07	6.22E-06	7.77E-05	0	0	8.10E+03	0	0	0	0	0
Nd147	LaGrp	NONE	NONE	1.63E+04	7.10E-07	6.73E+01	2.29E-02	0	0	6.85E+03	0	0	0	0	0
Am241	LaGrp	NONE	NONE	8.50E+04	4.80E-11	5.92E+03	3.03E-03	0	0	4.44E+08	0	0	0	0	0
Cm242	LaGrp	NONE	NONE	1.78E+03	4.94E-08	3.48E+03	2.11E-05	0	0	1.73E+07	0	0	0	0	0
Cm244	LaGrp	NONE	NONE	7.10E+01	1.25E-09	3.74E+03	1.82E-05	0	0	2.48E+08	0	0	0	0	0
Ce141	CeGrp	La141	NONE	4.28E+04	2.51E-07	9.44E+01	1.27E-02	0	0	8.95E+03	0	0	0	0	0
Ce143	CeGrp	NONE	Pr143	3.00E+04	6.03E-06	2.31E+01	4.77E-02	0	0	3.39E+03	0	0	0	0	0
Ce144	CeGrp	NONE	NONE	3.48E+04	2.77E-08	1.08E+03	1.03E-02	0	0	3.74E+05	0	0	0	0	0
Np239	CeGrp	NONE	NONE	4.32E+05	3.44E-06	2.82E+01	2.85E-02	0	0	2.51E+03	0	0	0	0	0
Pu238	CeGrp	NONE	NONE	1.04E+02	2.40E-10	1.43E+03	1.81E-05	0	0	2.88E+08	0	0	0	0	0
Pu239	CeGrp	NONE	NONE	1.43E+01	9.00E-13	1.39E+03	1.57E-05	0	0	3.08E+08	0	0	0	0	0
Pu240	CeGrp	NONE	NONE	2.10E+01	3.30E-12	1.39E+03	1.76E-05	0	0	3.08E+08	0	0	0	0	0
Pu241	CeGrp	NONE	NONE	4.99E+03	1.67E-09	3.39E+01	2.68E-07	0	0	4.96E+06	0	0	0	0	0
Sr89	SrGrp	NONE	NONE	2.52E+04	1.59E-07	2.95E+01	2.86E-04	0	0	6.51E+03	0	0	0	0	0
Sr90	SrGrp	NONE	Y90	3.33E+03	8.00E-10	9.95E+02	2.79E-05	0	0	2.39E+05	0	0	0	0	0
Sr91	SrGrp	NONE	Y91	1.23E+04	2.01E-05	3.67E+01	1.82E-01	0	0	9.32E+02	0	0	0	0	0
Sr92	SrGrp	NONE	Y92	1.11E+03	7.29E-05	1.45E+01	2.51E-01	0	0	6.29E+02	0	0	0	0	0

**Attachment 2.1: STARDOSE Input file for creation of decayed STARDOSE library files  
(LIBFILE1.TXT) found in Attachments 1.2 and 1.3**

```
edit_time
0      8.7  13
end_edit_time

participating_isotopes
Kr83m  Kr85m  Kr85   Kr87   Kr88   Kr89
Xe131m Xe133m Xe133  Xe135m Xe135  Xe137  Xe138
I131Org I131Elem I131Part I132Org I132Elem I132Part
I133Org I133Elem I133Part I134Org I134Elem I134Part
I135Org I135Elem I135Part Rb86   Cs134   Cs136   Cs137
Sb127  Sb129  Te127m Te127  Te129m Te129  Te131m Te132
Ba137m Ba139  Ba140
Mo99   Tc99m  Ru103  Ru105  Ru106  Rh105
Y90    Y91    Y92    Y93    Zr95   Zr97   Nb95
La140  La141  La142  Pr143  Nd147  Am241  Cm242  Cm244
Ce141  Ce143  Ce144  Np239  Pu238  Pu239  Pu240  Pu241
Sr89   Sr90   Sr91   Sr92
end_participating_isotopes

core
thermal_power          1
elemental_iodine_frac  1
organic_iodine_frac    1
particulate_iodine_frac 1
release_frac           1
to_control_volume      DW
Time      N_Gas  I_Grp  CsGrp  TeGrp  BaGrp  NMtls  CeGrp  LaGrp  SrGrp
0.01667  60     60     60     60     60     60     60     60     60
13       0     0     0     0     0     0     0     0     0
end_to_control_volume
end_release_frac
end_core

control_volume
obj_type          OBJ_CV
name              Core'
air_volume        1
water_volume      0
surface_area      0
has_recirc_filter false
end_control_volume

junction
junction_type     AIR_JUNCTION
downstream_location AIR_SPACE
upstream          CORE
downstream        Core'
flow_rate
Time (hr)        Rate (cfm)
13                1
end_flow_rate
has_filter        false
end_junction
```

**Attachment 2.2: STARDOSE Input file to refine Worst 2hr EAB**

```

edit_time
0 0.25 0.5 0.75 1.0 1.25 1.5 1.75 2 2.25 2.5 2.75 3 3.25 3.5 3.75 4 4.25 4.5
4.75 5 5.25 5.5 5.75 6
end_edit_time

participating_isotopes
Kr83m Kr85m Kr85 Kr87 Kr88 Kr89
Xe131m Xe133m Xe133 Xe135m Xe135 Xe137 Xe138
I131Org I131Elem I131Part
I132Org I132Elem I132Part
I133Org I133Elem I133Part
I134Org I134Elem I134Part
I135Org I135Elem I135Part
Rb86 Cs134 Cs136 Cs137
Sb127 Sb129 Te127m Te127 Te129m Te129 Te131m Te132
Ba137m Ba139 Ba140
Mo99 Tc99m Ru103 Ru105 Ru106 Rh105
Y90 Y91 Y92 Y93 Zr95 Zr97 Nb95
La140 La141 La142 Pr143 Nd147 Am241 Cm242 Cm244
Ce141 Ce143 Ce144 Np239 Pu238 Pu239 Pu240 Pu241
Sr89 Sr90 Sr91 Sr92
end_participating_isotopes

core
thermal_power 1969
elemental_iodine_frac 0.0485
organic_iodine_frac 0.0015
particulate_iodine_frac 0.95
release_frac
to_control_volume DW
Time N_Gas I_Grp CsGrp TeGrp BaGrp NMtls CeGrp LaGrp SrGrp
0.008 0 0 0 0 0 0 0 0 0
0.508 0.1 0.1 0.1 0 0 0 0 0 0
2.008 0.633 0.167 0.133 0.033 0.0133 0.00167 0.00033 0.00013 0.0133
720 0 0 0 0 0 0 0 0 0
end_to_control_volume
to_control_volume SP
Time N_Gas I_Grp CsGrp TeGrp BaGrp NMtls CeGrp LaGrp SrGrp
0.008 0 0 0 0 0 0 0 0 0
0.508 0 0.2 0 0 0 0 0 0 0
2.008 0 0.334 0 0 0 0 0 0 0
720 0 0 0 0 0 0 0 0 0
end_to_control_volume
end_release_frac
end_core

control_volume
obj_type OBJ_CV
name DW
air_volume 1.80e+005
water_volume 0
surface_area 1
has_recirc_filter false
removal_rate_to_surface
Time NobleGas ElemIodine OrgIodine PartIodine Solubles Insolubles
0.1663 0. 0.1884 0. 0.1884 0.1884 0.1884
  
```

0.3710	0.	29.112	0.	29.112	29.112	29.112
0.4142	0.	0.1391	0.	0.1391	0.1391	0.1391
0.4645	0.	31.715	0.	31.715	31.715	31.715
0.7019	0.	0.2725	0.	0.2725	0.2725	0.2725
0.9336	0.	43.141	0.	43.141	43.141	43.141
1.1291	0.	0.3249	0.	0.3249	0.3249	0.3249
1.2935	0.	47.768	0.	47.768	47.768	47.768
1.4341	0.	38.321	0.	38.321	38.321	38.321
1.4998	0.	22.051	0.	22.051	22.051	22.051
1.5698	0.	18.779	0.	18.779	18.779	18.779
1.6567	0.	17.362	0.	17.362	17.362	17.362
1.7535	0.	16.711	0.	16.711	16.711	16.711
2.0073	0.	16.450	0.	16.450	16.450	16.450
2.3386	0.	5.6187	0.	5.6187	5.6187	5.6187
3.7749	0.	6.398	0.	6.398	6.398	6.398
4.6334	0.	0.0645	0.	0.0645	0.0645	0.0645
5.9327	0.	2.3642	0.	2.3642	2.3642	2.3642
6.3527	0.	3.4811	0.	3.4811	3.4811	3.4811
6.8036	0.	4.4852	0.	4.4852	4.4852	4.4852
7.2442	0.	5.4898	0.	5.4898	5.4898	5.4898
7.6754	0.	6.4876	0.	6.4876	6.4876	6.4876
7.7909	0.	7.4403	0.	7.4403	7.4403	7.4403
24.729	0.	0.1997	0.	0.1997	0.1997	0.1997
720.00	0.	0.0	0.	0.0	0.0	0.0

end\_removal\_rate\_to\_surface

frac\_4\_daughter\_resusp\_from\_surface

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
720	1	0	0	0	0

end\_frac\_4\_daughter\_resusp\_from\_surface

end\_control\_volume

control\_volume

obj_type	OBJ_CV
name	WW
air_volume	1.28e+005
water_volume	8.2e+004
surface_area	0
has_recirc_filter	false

removal\_rate\_to\_waterpool

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles	Insolubles
1.129	0	0	0	0	0	0
3.778	0	1.5	0	1.5	1.5	1.5
5.222	0	0	0	0	0	0
7.844	0	0.15	0	0.15	0.15	0.15
720	0	0	0	0	0	0

end\_removal\_rate\_to\_waterpool

frac\_4\_daughter\_resusp\_from\_water

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
720	1	0	0	0	0

end\_frac\_4\_daughter\_resusp\_from\_water

decontamination\_factor

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
720	1	1	1	1	1

1

end\_decontamination\_factor

end\_control\_volume

control\_volume  
obj\_type OBJ\_CV  
name RB  
air\_volume 1300  
water\_volume 0  
surface\_area 0  
has\_recirc\_filter false  
end\_control\_volume

control\_volume  
obj\_type OBJ\_CV  
name Dummy  
air\_volume 1  
water\_volume 0  
surface\_area 0  
has\_recirc\_filter false  
end\_control\_volume

control\_volume  
obj\_type OBJ\_CV  
name SP  
air\_volume 8.2e+004  
water\_volume 0  
surface\_area 0  
has\_recirc\_filter false  
end\_control\_volume

control\_volume  
obj\_type OBJ\_CR  
name Control\_Room  
air\_volume 27500  
water\_volume 0  
surface\_area 0  
has\_recirc\_filter false  
breathing\_rate  
Time (hr) Value (cms)  
720 0.000347  
end\_breathing\_rate

occupancy\_factor  
Time (hr) Value (frac)  
24 1  
720 0.25  
end\_occupancy\_factor

end\_control\_volume

junction  
junction\_type AIR\_JUNCTION  
downstream\_location AIR\_SPACE  
upstream CORE  
downstream DW  
flow\_rate

Time (hr)           Rate (cfm)  
0.508               1  
720                 1  
end\_flow\_rate  
has\_filter                       false  
end\_junction

junction  
junction\_type                   AIR\_JUNCTION  
downstream\_location           AIR\_SPACE  
upstream                       CORE  
downstream                     SP

flow\_rate  
Time (hr)           Rate (cfm)  
0.508               1  
720                 1  
end\_flow\_rate  
has\_filter                       false  
end\_junction

junction  
junction\_type                   AIR\_JUNCTION  
downstream\_location           WATER\_POOL  
upstream                       DW  
downstream                     WW  
has\_filter                     false

flow\_rate  
Time (hr)           Value (cfm)  
1.129               0  
1.296               9180  
2.008               0  
720                 3e+004  
end\_flow\_rate  
end\_junction

junction  
junction\_type                   AIR\_JUNCTION  
downstream\_location           AIR\_SPACE  
upstream                       DW  
downstream                     RB  
has\_filter                     false

flow\_rate  
Time (hr)           Value (cfm)  
24                   0.96  
720                 0.48  
end\_flow\_rate  
end\_junction

junction  
junction\_type                   AIR\_JUNCTION  
downstream\_location           AIR\_SPACE  
upstream                       DW  
downstream                     Dummy  
has\_filter                     false

flow\_rate  
Time (hr)           Value (cfm)  
24                   0.095

720 0.0475  
 end\_flow\_rate  
 end\_junction

junction  
 junction\_type AIR\_JUNCTION  
 downstream\_location AIR\_SPACE  
 upstream DW  
 downstream Dummy  
 has\_filter false  
 flow\_rate  
 Time (hr) Value (cfm)  
 24 0.12  
 720 0.06  
 end\_flow\_rate  
 end\_junction

junction  
 junction\_type AIR\_JUNCTION  
 downstream\_location AIR\_SPACE  
 upstream DW  
 downstream environment (2)  
 has\_filter true  
 flow\_rate  
 Time (hr) Value (cfm)  
 24 0.045  
 720 0.0225  
 end\_flow\_rate

filter_efficiency	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
Time					
Insolubles					
720	0	0.5	0	0.965	0.965
0.965					

end\_filter\_efficiency

frac_4_daughter_resusp	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
Time					
Insolubles					
720	1	1	0	0	0
0					

end\_frac\_4\_daughter\_resusp

X_over_Q_4_ctrl_room	Value (s/m*3)
Time (hr)	
8.7	0.000876
16.7	0.00271
24	0.000876
96	0.000863
720	0.000845

end\_X\_over\_Q\_4\_ctrl\_room

X_over_Q_4_site_boundary	Value (s/m*3)
Time (hr)	
24	1.41e-3

end\_X\_over\_Q\_4\_site\_boundary

```
X_over_Q_4_low_population_zone
Time (hr)      Value (s/m*3)
8.7            4.23e-5
10.7           1.35e-4
16.7           6.23e-5
24             4.23e-5
96            1.82e-5
720           5.43e-6
end_X_over_Q_4_low_population_zone
```

end\_junction

```
junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           DW
downstream         environment (3)
has_filter         true
flow_rate
Time (hr)          Value (cfm)
24                 0.0301
720                0.0151
end_flow_rate
```

```
filter_efficiency
Time  NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
720   0             0.5            0              0.916           0.916
0.916
end_filter_efficiency
```

```
frac_4_daughter_resusp
Time  NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
720   1             1              0              0              0
0
end_frac_4_daughter_resusp
```

```
X_over_Q_4_ctrl_room
Time (hr)      Value (s/m*3)
8.7            1.15e-003
16.7           2.59e-003
24             1.15e-003
96            8.44e-004
720           7.18e-004
end_X_over_Q_4_ctrl_room
```

```
X_over_Q_4_site_boundary
Time (hr)      Value (s/m*3)
24            1.41e-3
end_X_over_Q_4_site_boundary
```

```
X_over_Q_4_low_population_zone
Time (hr)      Value (s/m*3)
8.7            4.23e-5
10.7           1.35e-4
```

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```
16.7          6.23e-5
24            4.23e-5
96            1.82e-5
720           5.43e-6
end_X_over_Q_4_low_population_zone
```

end\_junction

```
junction
junction_type          AIR_JUNCTION
downstream_location    AIR_SPACE
upstream               WW
downstream             DW
has_filter             false
flow_rate
Time (hr)              Value (cfm)
1.296                  0
1.463                  9180
2.008                  0
720                    3e+004
end_flow_rate
end_junction
```

```
junction
junction_type          AIR_JUNCTION
downstream_location    AIR_SPACE
upstream               WW
downstream             RB
has_filter             false
flow_rate
Time (hr)              Value (cfm)
24                     0.76
720                    0.38
end_flow_rate
end_junction
```

```
junction
junction_type          AIR_JUNCTION
downstream_location    AIR_SPACE
upstream               WW
downstream             environment
has_filter             true
flow_rate
Time (hr)              Value (cfm)
24                     0.130
720                    0.065
end_flow_rate
```

```
filter_efficiency
Time  NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
720   0              0.5             0              0.916           0.916
0.916
end_filter_efficiency
```

frac\_4\_daughter\_resusp

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
720	1	1	0	0	0

0  
end\_frac\_4\_daughter\_resusp

X\_over\_Q\_4\_ctrl\_room

Time (hr)	Value (s/m*3)
8.7	1.15e-003
16.7	2.59e-003
24	1.15e-003
96	8.44e-004
720	7.18e-004

end\_X\_over\_Q\_4\_ctrl\_room

X\_over\_Q\_4\_site\_boundary

Time (hr)	Value (s/m*3)
24	1.41e-3

end\_X\_over\_Q\_4\_site\_boundary

X\_over\_Q\_4\_low\_population\_zone

Time (hr)	Value (s/m*3)
8.7	4.23e-5
10.7	1.35e-4
16.7	6.23e-5
24	4.23e-5
96	1.82e-5
720	5.43e-6

end\_X\_over\_Q\_4\_low\_population\_zone

end\_junction

junction

junction_type	AIR_JUNCTION
downstream_location	AIR_SPACE
upstream	SP
downstream	RB
has_filter	true

Time (hr)	Rate (cfm)
720	0.13

end\_flow\_rate

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
720	0	0	0	1	0

0  
end\_filter\_efficiency

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
720	1	0	0	0	0

0  
end\_frac\_4\_daughter\_resusp  
end\_junction

```
junction
junction_type          AIR_JUNCTION
downstream_location    AIR_SPACE
upstream               RB
downstream             environment
has_filter             true
flow_rate
Time (hr)              Value (cfm)
720                    2600
end_flow_rate
```

```
filter_efficiency
Time  NobleGas      ElemIodine  OrgIodine  PartIodine  Solubles
Insolubles
720   0              0.9         0.9        0.9         0.9
0.9
end_filter_efficiency
```

```
frac_4_daughter_resusp
Time  NobleGas      ElemIodine  OrgIodine  PartIodine  Solubles
Insolubles
720   1              1           0          0           0
0
end_frac_4_daughter_resusp
```

```
X_over_Q_4_ctrl_room
Time (hr)              Value (s/m*3)
8.7                    9.67e-005
16.7                   1.8e-004
24                     9.67e-005
96                     2.5e-005
720                    3.6e-006
end_X_over_Q_4_ctrl_room
```

```
X_over_Q_4_site_boundary
Time (hr)              Value (s/m*3)
24                     1.07e-4
end_X_over_Q_4_site_boundary
```

```
X_over_Q_4_low_population_zone
Time (hr)              Value (s/m*3)
4                      1.68e-5
8.7                    6.19e-7
16.7                   8.88e-7
24                     6.19e-7
96                     2.83e-7
720                    9.16e-8
end_X_over_Q_4_low_population_zone
```

end\_junction

```
junction
junction_type          AIR_JUNCTION
downstream_location    AIR_SPACE
upstream               environment
downstream             Control_Room
```

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```

has_filter                false
flow_rate
Time (hr)                Value (cfm)
720                      14000
end_flow_rate
end_junction

```

```

junction
junction_type            AIR_JUNCTION
downstream_location     AIR_SPACE
upstream                Control_Room
downstream              environment
has_filter              false
flow_rate
Time (hr)                Value (cfm)
720                      14000
end_flow_rate

```

```

X_over_Q_4_ctrl_room
Time (hr)                Value (s/m*3)
720                      0
end_X_over_Q_4_ctrl_room

```

```

X_over_Q_4_site_boundary
Time (hr)                Value (s/m*3)
720                      0
end_X_over_Q_4_site_boundary

```

```

X_over_Q_4_low_population_zone
Time (hr)                Value (s/m*3)
720                      0
end_X_over_Q_4_low_population_zone

```

end\_junction

```

environment
breathing_rate_sb
Time (hr)                Value (cms)
24                      0.000347
720                      0.0
end_breathing_rate_sb

```

```

breathing_rate_lpz
Time (hr)                Value (cms)
8                      0.000347
24                      0.000175
720                      0.000232
end_breathing_rate_lpz

```

end\_environment

**Attachment 2.3: STARDOSE Input file for Case 1**

```

edit_time
0      0.167  1.129  2.008  4      8      24
72     96     504   720
end_edit_time

participating_isotopes
Kr83m  Kr85m  Kr85   Kr87   Kr88   Kr89
Xe131m Xe133m Xe133  Xe135m Xe135  Xe137  Xe138
I131Org I131Elem I131Part
I132Org I132Elem I132Part
I133Org I133Elem I133Part
I134Org I134Elem I134Part
I135Org I135Elem I135Part
Rb86   Cs134   Cs136  Cs137
Sb127  Sb129  Te127m Te127  Te129m Te129  Te131m Te132
Ba137m Ba139  Ba140
Mo99   Tc99m  Ru103  Ru105  Ru106  Rh105
Y90    Y91    Y92    Y93    Zr95   Zr97   Nb95
La140  La141  La142  Pr143  Nd147  Am241  Cm242  Cm244
Ce141  Ce143  Ce144  Np239  Pu238  Pu239  Pu240  Pu241
Sr89   Sr90   Sr91   Sr92
end_participating_isotopes

core
thermal_power          1969
elemental_iodine_frac  0.0485
organic_iodine_frac    0.0015
particulate_iodine_frac 0.95
release_frac
to_control_volume      DW
Time   N_Gas  I_Grp  CsGrp  TeGrp  BaGrp  NMtls  CeGrp  LaGrp  SrGrp
0.008  0      0      0      0      0      0      0      0      0
0.508  0.1    0.1    0.1    0      0      0      0      0      0
2.008  0.633  0.167  0.133  0.033  0.0133 0.00167 0.00033 0.00013 0.0133
720    0      0      0      0      0      0      0      0      0
end_to_control_volume
to_control_volume      SP
Time   N_Gas  I_Grp  CsGrp  TeGrp  BaGrp  NMtls  CeGrp  LaGrp  SrGrp
0.008  0      0      0      0      0      0      0      0      0
0.508  0      0.2    0      0      0      0      0      0      0
2.008  0      0.334  0      0      0      0      0      0      0
720    0      0      0      0      0      0      0      0      0
end_to_control_volume
end_release_frac
end_core

control_volume
obj_type          OBJ_CV
name              DW
air_volume        1.80e+005
water_volume      0
surface_area      1
has_recirc_filter false
removal_rate_to_surface
  
```

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles	Insolubles
0.1663	0.	0.1884	0.	0.1884	0.1884	0.1884
0.3710	0.	29.112	0.	29.112	29.112	29.112
0.4142	0.	0.1391	0.	0.1391	0.1391	0.1391
0.4645	0.	31.715	0.	31.715	31.715	31.715
0.7019	0.	0.2725	0.	0.2725	0.2725	0.2725
0.9336	0.	43.141	0.	43.141	43.141	43.141
1.1291	0.	0.3249	0.	0.3249	0.3249	0.3249
1.2935	0.	47.768	0.	47.768	47.768	47.768
1.4341	0.	38.321	0.	38.321	38.321	38.321
1.4998	0.	22.051	0.	22.051	22.051	22.051
1.5698	0.	18.779	0.	18.779	18.779	18.779
1.6567	0.	17.362	0.	17.362	17.362	17.362
1.7535	0.	16.711	0.	16.711	16.711	16.711
2.0073	0.	16.450	0.	16.450	16.450	16.450
2.3386	0.	5.6187	0.	5.6187	5.6187	5.6187
3.7749	0.	6.398	0.	6.398	6.398	6.398
4.6334	0.	0.0645	0.	0.0645	0.0645	0.0645
5.9327	0.	2.3642	0.	2.3642	2.3642	2.3642
6.3527	0.	3.4811	0.	3.4811	3.4811	3.4811
6.8036	0.	4.4852	0.	4.4852	4.4852	4.4852
7.2442	0.	5.4898	0.	5.4898	5.4898	5.4898
7.6754	0.	6.4876	0.	6.4876	6.4876	6.4876
7.7909	0.	7.4403	0.	7.4403	7.4403	7.4403
24.729	0.	0.1997	0.	0.1997	0.1997	0.1997
720.00	0.	0.0	0.	0.0	0.0	0.0

end\_removal\_rate\_to\_surface

frac\_4\_daughter\_resusp\_from\_surface

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
720	1	0	0	0	0

end\_frac\_4\_daughter\_resusp\_from\_surface

end\_control\_volume

control\_volume

obj_type	OBJ_CV
name	WW
air_volume	1.28e+005
water_volume	8.2e+004
surface_area	0
has_recirc_filter	false

removal\_rate\_to\_waterpool

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles	Insolubles
1.129	0	0	0	0	0	0
3.778	0	1.5	0	1.5	1.5	1.5
5.222	0	0	0	0	0	0
7.844	0	0.15	0	0.15	0.15	0.15
720	0	0	0	0	0	0

end\_removal\_rate\_to\_waterpool

frac\_4\_daughter\_resusp\_from\_water

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
720	1	0	0	0	0

end\_frac\_4\_daughter\_resusp\_from\_water

decontamination\_factor

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
Insolubles					

720 1 1 1 1 1  
 1  
 end\_decontamination\_factor

end\_control\_volume

control\_volume  
 obj\_type OBJ\_CV  
 name RB  
 air\_volume 1300  
 water\_volume 0  
 surface\_area 0  
 has\_recirc\_filter false  
 end\_control\_volume

control\_volume  
 obj\_type OBJ\_CV  
 name Dummy  
 air\_volume 1  
 water\_volume 0  
 surface\_area 0  
 has\_recirc\_filter false  
 end\_control\_volume

control\_volume  
 obj\_type OBJ\_CV  
 name SP  
 air\_volume 8.2e+004  
 water\_volume 0  
 surface\_area 0  
 has\_recirc\_filter false  
 end\_control\_volume

control\_volume  
 obj\_type OBJ\_CR  
 name Control\_Room  
 air\_volume 27500  
 water\_volume 0  
 surface\_area 0  
 has\_recirc\_filter false  
 breathing\_rate

Time (hr)	Value (cms)
720	0.000347

end\_breathing\_rate

occupancy\_factor  
 Time (hr) Value (frac)  
 24 1  
 720 0.25  
 end\_occupancy\_factor

end\_control\_volume

junction  
 junction\_type AIR\_JUNCTION  
 downstream\_location AIR\_SPACE  
 upstream CORE

```
downstream DW
flow_rate
Time (hr)      Rate (cfm)
0.508          1
720            1
end_flow_rate
has_filter     false
end_junction

junction
junction_type  AIR_JUNCTION
downstream_location AIR_SPACE
upstream      CORE
downstream    SP
flow_rate
Time (hr)      Rate (cfm)
0.508          1
720            1
end_flow_rate
has_filter     false
end_junction

junction
junction_type  AIR_JUNCTION
downstream_location WATER_POOL
upstream      DW
downstream    WW
has_filter     false
flow_rate
Time (hr)      Value (cfm)
1.129          0
1.296          9180
2.008          0
720            3e+004
end_flow_rate
end_junction

junction
junction_type  AIR_JUNCTION
downstream_location AIR_SPACE
upstream      DW
downstream    RB
has_filter     false
flow_rate
Time (hr)      Value (cfm)
24             0.96
720            0.48
end_flow_rate
end_junction

junction
junction_type  AIR_JUNCTION
downstream_location AIR_SPACE
upstream      DW
downstream    Dummy
has_filter     false
flow_rate
```

Time (hr)            Value (cfm)  
 24                    0.095  
 720                   0.0475  
 end\_flow\_rate  
 end\_junction

junction  
 junction\_type                    AIR\_JUNCTION  
 downstream\_location            AIR\_SPACE  
 upstream                         DW  
 downstream                      Dummy  
 has\_filter                       false

Time (hr)            Value (cfm)  
 24                    0.12  
 720                   0.06  
 end\_flow\_rate  
 end\_junction

junction  
 junction\_type                    AIR\_JUNCTION  
 downstream\_location            AIR\_SPACE  
 upstream                         DW  
 downstream                      environment (2)  
 has\_filter                       true

Time (hr)            Value (cfm)  
 24                    0.045  
 720                   0.0225  
 end\_flow\_rate

filter\_efficiency  
 Time    NobleGas            ElemIodine            OrgIodine            PartIodine            Solubles  
 Insolubles  
 720    0                    0.5                    0                    0.965                0.965  
 0.965  
 end\_filter\_efficiency

frac\_4\_daughter\_resusp  
 Time    NobleGas            ElemIodine            OrgIodine            PartIodine            Solubles  
 Insolubles  
 720    1                    1                    0                    0                    0  
 0  
 end\_frac\_4\_daughter\_resusp

X\_over\_Q\_4\_ctrl\_room  
 Time (hr)            Value (s/m\*3)  
 8.7                    0.000876  
 16.7                   0.00271  
 24                    0.000876  
 96                    0.000863  
 720                   0.000845  
 end\_X\_over\_Q\_4\_ctrl\_room

X\_over\_Q\_4\_site\_boundary  
 Time (hr)            Value (s/m\*3)  
 1                    0

3 1.41e-3  
24 0  
96 0  
720 0  
end\_X\_over\_Q\_4\_site\_boundary

X\_over\_Q\_4\_low\_population\_zone  
Time (hr) Value (s/m\*3)  
1 6.23e-5  
3 1.35e-4  
8 6.23e-5  
24 4.23e-5  
96 1.82e-5  
720 5.43e-6  
end\_X\_over\_Q\_4\_low\_population\_zone

end\_junction

junction  
junction\_type AIR\_JUNCTION  
downstream\_location AIR\_SPACE  
upstream DW  
downstream environment (3)  
has\_filter true  
flow\_rate  
Time (hr) Value (cfm)  
24 0.0301  
720 0.0151  
end\_flow\_rate

filter\_efficiency  
Time NobleGas ElemIodine OrgIodine PartIodine Solubles  
Insolubles  
720 0 0.5 0 0.916 0.916  
0.916  
end\_filter\_efficiency

frac\_4\_daughter\_resusp  
Time NobleGas ElemIodine OrgIodine PartIodine Solubles  
Insolubles  
720 1 1 0 0 0  
0  
end\_frac\_4\_daughter\_resusp

X\_over\_Q\_4\_ctrl\_room  
Time (hr) Value (s/m\*3)  
8.7 1.15e-003  
16.7 2.59e-003  
24 1.15e-003  
96 8.44e-004  
720 7.18e-004  
end\_X\_over\_Q\_4\_ctrl\_room

X\_over\_Q\_4\_site\_boundary  
Time (hr) Value (s/m\*3)  
1 0  
3 1.41e-3

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```

24          0
96          0
720        0
end_X_over_Q_4_site_boundary

X_over_Q_4_low_population_zone
Time (hr)      Value (s/m*3)
1              6.23e-5
3              1.35e-4
8              6.23e-5
24             4.23e-5
96             1.82e-5
720            5.43e-6
end_X_over_Q_4_low_population_zone

end_junction

junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           WW
downstream         DW
has_filter         false
flow_rate
Time (hr)          Value (cfm)
1.296              0
1.463              9180
2.008              0
720                3e+004
end_flow_rate
end_junction

junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           WW
downstream         RB
has_filter         false
flow_rate
Time (hr)          Value (cfm)
24                 0.76
720                0.38
end_flow_rate
end_junction

junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           WW
downstream         environment
has_filter         true
flow_rate
Time (hr)          Value (cfm)
24                 0.130
720                0.065
end_flow_rate

```

```
filter_efficiency
Time   NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
720    0                0.5             0              0.916           0.916
0.916
end_filter_efficiency
```

```
frac_4_daughter_resusp
Time   NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
720    1                1              0              0              0
0
end_frac_4_daughter_resusp
```

```
X_over_Q_4_ctrl_room
Time (hr)      Value (s/m*3)
8.7            1.15e-003
16.7           2.59e-003
24             1.15e-003
96            8.44e-004
720           7.18e-004
end_X_over_Q_4_ctrl_room
```

```
X_over_Q_4_site_boundary
Time (hr)      Value (s/m*3)
1              0
3             1.41e-3
24            0
96            0
720           0
end_X_over_Q_4_site_boundary
```

```
X_over_Q_4_low_population_zone
Time (hr)      Value (s/m*3)
1             6.23e-5
3            1.35e-4
8            6.23e-5
24           4.23e-5
96           1.82e-5
720          5.43e-6
end_X_over_Q_4_low_population_zone
```

end\_junction

```
junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           SP
downstream         RB
has_filter         true
flow_rate
Time (hr)          Rate (cfm)
720                0.13
end_flow_rate
```

filter\_efficiency

```

Time      NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
720      0              0              0              1              0
0
end_filter_efficiency
  
```

```

frac_4_daughter_resusp
Time      NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
720      1              0              0              0              0
0
end_frac_4_daughter_resusp
end_junction
  
```

```

junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           RB
downstream         environment
has_filter         true
flow_rate
Time (hr)      Value (cfm)
720           2600
end_flow_rate
  
```

```

filter_efficiency
Time      NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
720      0              0.9            0.9            0.9            0.9
0.9
end_filter_efficiency
  
```

```

frac_4_daughter_resusp
Time      NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
720      1              1              0              0              0
0
end_frac_4_daughter_resusp
  
```

```

X_over_Q_4_ctrl_room
Time (hr)      Value (s/m*3)
8.7           9.67e-005
16.7          1.8e-004
24            9.67e-005
96            2.5e-005
720           3.6e-006
end_X_over_Q_4_ctrl_room
  
```

```

X_over_Q_4_site_boundary
Time (hr)      Value (s/m*3)
1              0
3              1.07e-4
24            0
96            0
720           0
end_X_over_Q_4_site_boundary
  
```

```
X_over_Q_4_low_population_zone
Time (hr)      Value (s/m*3)
4              1.68e-5
8              8.88e-7
24             6.19e-7
96             2.83e-7
720           9.16e-8
end_X_over_Q_4_low_population_zone
```

end\_junction

```
junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           environment
downstream         Control_Room
has_filter         false
flow_rate
Time (hr)          Value (cfm)
720                14000
end_flow_rate
end_junction
```

```
junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           Control_Room
downstream         environment
has_filter         false
flow_rate
Time (hr)          Value (cfm)
720                14000
end_flow_rate
```

```
X_over_Q_4_ctrl_room
Time (hr)          Value (s/m*3)
720                0
end_X_over_Q_4_ctrl_room
```

```
X_over_Q_4_site_boundary
Time (hr)          Value (s/m*3)
720                0
end_X_over_Q_4_site_boundary
```

```
X_over_Q_4_low_population_zone
Time (hr)          Value (s/m*3)
720                0
end_X_over_Q_4_low_population_zone
```

end\_junction

```
environment
breathing_rate_sb
Time (hr)          Value (cms)
24                 0.000347
720                0.0
end_breathing_rate_sb
```

```
breathing_rate_lpz
Time (hr)      Value (cms)
8              0.000347
24             0.000175
720            0.000232
end_breathing_rate_lpz

end_environment
```

**Attachment 2.4: STARDOSE Input file for Case 2**

```
edit_time
0      15.3      87.3  495.3  711.3
end_edit_time

participating_isotopes
Kr83m  Kr85m  Kr85   Kr87   Kr88   Kr89
Xe131m Xe133m Xe133  Xe135m Xe135  Xe137  Xe138
I131Org I131Elem I131Part
I132Org I132Elem I132Part
I133Org I133Elem I133Part
I134Org I134Elem I134Part
I135Org I135Elem I135Part
Rb86   Cs134  Cs136  Cs137
Sb127  Sb129  Te127m Te127  Te129m Te129  Te131m Te132
Ba137m Ba139  Ba140
Mo99   Tc99m  Ru103  Ru105  Ru106  Rh105
Y90    Y91    Y92    Y93    Zr95   Zr97   Nb95
La140  La141  La142  Pr143  Nd147  Am241  Cm242  Cm244
Ce141  Ce143  Ce144  Np239  Pu238  Pu239  Pu240  Pu241
Sr89   Sr90   Sr91   Sr92
end_participating_isotopes

core
thermal_power          1969
elemental_iodine_frac  0.0485
organic_iodine_frac    0.0015
particulate_iodine_frac 0.95
release_frac
to_control_volume      DW
Time   N_Gas  I_Grp  CsGrp  TeGrp  BaGrp  NMtls  CeGrp  LaGrp  SrGrp
0.008  0      0      0      0      0      0      0      0      0
0.508  0.1    0.1    0.1    0      0      0      0      0      0
2.008  0.633  0.167  0.133  0.033  0.0133 0.00167 0.00033 0.00013 0.0133
711.3  0      0      0      0      0      0      0      0      0
end_to_control_volume
end_release_frac
end_core

control_volume
obj_type          OBJ_CV
name              DW
air_volume        1.80e+005
water_volume      0
surface_area      1
has_recirc_filter false
removal_rate_to_surface
Time  NobleGas  ElemIodine  OrgIodine  PartIodine  Solubles  Insolubles
0.1663  0.        0.1884      0.          0.1884      0.1884    0.1884
0.3710  0.        29.112      0.          29.112      29.112    29.112
0.4142  0.        0.1391      0.          0.1391      0.1391    0.1391
0.4645  0.        31.715      0.          31.715      31.715    31.715
0.7019  0.        0.2725      0.          0.2725      0.2725    0.2725
0.9336  0.        43.141      0.          43.141      43.141    43.141
1.1291  0.        0.3249      0.          0.3249      0.3249    0.3249
1.2935  0.        47.768      0.          47.768      47.768    47.768
```

1.4341	0.	38.321	0.	38.321	38.321	38.321
1.4998	0.	22.051	0.	22.051	22.051	22.051
1.5698	0.	18.779	0.	18.779	18.779	18.779
1.6567	0.	17.362	0.	17.362	17.362	17.362
1.7535	0.	16.711	0.	16.711	16.711	16.711
2.0073	0.	16.450	0.	16.450	16.450	16.450
2.3386	0.	5.6187	0.	5.6187	5.6187	5.6187
3.7749	0.	6.398	0.	6.398	6.398	6.398
4.6334	0.	0.0645	0.	0.0645	0.0645	0.0645
5.9327	0.	2.3642	0.	2.3642	2.3642	2.3642
6.3527	0.	3.4811	0.	3.4811	3.4811	3.4811
6.8036	0.	4.4852	0.	4.4852	4.4852	4.4852
7.2442	0.	5.4898	0.	5.4898	5.4898	5.4898
7.6754	0.	6.4876	0.	6.4876	6.4876	6.4876
7.7909	0.	7.4403	0.	7.4403	7.4403	7.4403
24.729	0.	0.1997	0.	0.1997	0.1997	0.1997
711.30	0.	0.0	0.	0.0	0.0	0.0

end\_removal\_rate\_to\_surface

frac\_4\_daughter\_resusp\_from\_surface

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
711.3	1	0	0	0	0
0					

end\_frac\_4\_daughter\_resusp\_from\_surface

end\_control\_volume

control\_volume

obj_type	OBJ_CV
name	WW
air_volume	1.28e+005
water_volume	8.2e+004
surface_area	0
has_recirc_filter	false

removal\_rate\_to\_waterpool

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles	Insolubles
1.129	0	0	0	0	0	0
3.778	0	1.5	0	1.5	1.5	1.5
5.222	0	0	0	0	0	0
7.844	0	0.15	0	0.15	0.15	0.15
711.3	0	0	0	0	0	0

end\_removal\_rate\_to\_waterpool

frac\_4\_daughter\_resusp\_from\_water

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
711.3	1	0	0	0	0
0					

end\_frac\_4\_daughter\_resusp\_from\_water

decontamination\_factor

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
711.3	1	1	1	1	1
1					

end\_decontamination\_factor

end\_control\_volume

control\_volume

obj_type	OBJ_CV
name	Dummy
air_volume	1
water_volume	0
surface_area	0
has_recirc_filter	false
end_control_volume	

control_volume	
obj_type	OBJ_CR
name	Control_Room
air_volume	27500
water_volume	0
surface_area	0
has_recirc_filter	false
breathing_rate	
Time (hr)	Value (cms)
711.3	0.000347
end_breathing_rate	

occupancy_factor	
Time (hr)	Value (frac)
15.3	1
711.3	0.25
end_occupancy_factor	

end\_control\_volume

junction	
junction_type	AIR_JUNCTION
downstream_location	AIR_SPACE
upstream	CORE
downstream	DW
flow_rate	
Time (hr)	Rate (cfm)
0.508	1
711.3	1
end_flow_rate	
has_filter	false
end_junction	

junction	
junction_type	AIR_JUNCTION
downstream_location	WATER_POOL
upstream	DW
downstream	WW
has_filter	false
flow_rate	
Time (hr)	Value (cfm)
1.129	0
1.296	9180
2.008	0
711.3	3e+004
end_flow_rate	
end_junction	

junction

```

junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           DW
downstream         Dummy
has_filter         false
flow_rate
Time (hr)          Value (cfm)
24                 0.96
711.3              0.48
end_flow_rate
end_junction
  
```

```

junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           DW
downstream         Dummy
has_filter         false
flow_rate
Time (hr)          Value (cfm)
24                 0.095
711.3              0.0475
end_flow_rate
end_junction
  
```

```

junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           DW
downstream         environment (1)
has_filter         true
flow_rate
Time (hr)          Value (cfm)
15.3               0.12
711.3              0.06
end_flow_rate
  
```

```

filter_efficiency
Time  NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
711.3  0            0.5            0              0.5            0.5
0.5
end_filter_efficiency
  
```

```

frac_4_daughter_resusp
Time  NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
711.3  1            1              0              0              0
0
end_frac_4_daughter_resusp
  
```

```

X_over_Q_4_ctrl_room
Time (hr)          Value (s/m*3)
8                 0.00271
15.3              0.000876
87.3              0.000863
711.3             0.000845
  
```

end\_X\_over\_Q\_4\_ctrl\_room

X\_over\_Q\_4\_site\_boundary  
Time (hr) Value (s/m\*3)  
711.3 0  
end\_X\_over\_Q\_4\_site\_boundary

X\_over\_Q\_4\_low\_population\_zone  
Time (hr) Value (s/m\*3)  
15.3 4.23e-5  
87.3 1.82e-5  
711.3 5.43e-6  
end\_X\_over\_Q\_4\_low\_population\_zone

end\_junction

junction  
junction\_type AIR\_JUNCTION  
downstream\_location AIR\_SPACE  
upstream DW  
downstream Dummy  
has\_filter false  
flow\_rate  
Time (hr) Value (cfm)  
24 0.045  
711.3 0.0225  
end\_flow\_rate  
end\_junction

junction  
junction\_type AIR\_JUNCTION  
downstream\_location AIR\_SPACE  
upstream DW  
downstream Dummy  
has\_filter false  
flow\_rate  
Time (hr) Value (cfm)  
24 0.0301  
711.3 0.0151  
end\_flow\_rate  
end\_junction

junction  
junction\_type AIR\_JUNCTION  
downstream\_location AIR\_SPACE  
upstream WW  
downstream DW  
has\_filter false  
flow\_rate  
Time (hr) Value (cfm)  
1.296 0  
1.463 9180  
2.008 0  
711.3 3e+004  
end\_flow\_rate  
end\_junction

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```

junction
junction_type                AIR_JUNCTION
downstream_location          AIR_SPACE
upstream                      WW
downstream                   Dummy
has_filter                   false
flow_rate
Time (hr)                    Value (cfm)
24                            0.76
711.3                        0.38
end_flow_rate
end_junction
    
```

```

junction
junction_type                AIR_JUNCTION
downstream_location          AIR_SPACE
upstream                      WW
downstream                   Dummy
has_filter                   false
flow_rate
Time (hr)                    Value (cfm)
24                            0.130
711.3                        0.065
end_flow_rate
end_junction
    
```

```

junction
junction_type                AIR_JUNCTION
downstream_location          AIR_SPACE
upstream                      environment
downstream                   Control_Room
has_filter                   false
flow_rate
Time (hr)                    Value (cfm)
720                            14000
end_flow_rate
end_junction
    
```

```

junction
junction_type                AIR_JUNCTION
downstream_location          AIR_SPACE
upstream                      Control_Room
downstream                   environment
has_filter                   false
flow_rate
Time (hr)                    Value (cfm)
720                            14000
end_flow_rate
    
```

```

X_over_Q_4_ctrl_room
Time (hr)                    Value (s/m*3)
720                            0
end_X_over_Q_4_ctrl_room
    
```

```

X_over_Q_4_site_boundary
Time (hr)                    Value (s/m*3)
720                            0
    
```

```
end_X_over_Q_4_site_boundary

X_over_Q_4_low_population_zone
Time (hr)      Value (s/m*3)
720            0
end_X_over_Q_4_low_population_zone

end_junction

environment
breathing_rate_sb
Time (hr)      Value (cms)
711.3         0.0
end_breathing_rate_sb

breathing_rate_lpz
Time (hr)      Value (cms)
15.3          0.000175
711.3         0.000232
end_breathing_rate_lpz

end_environment
```

**Attachment 2.5: STARDOSE Input file for Case 3**

```

edit_time
0      11  83 491      707
end_edit_time

participating_isotopes
Kr83m  Kr85m  Kr85   Kr87   Kr88   Kr89
Xe131m Xe133m  Xe133  Xe135m Xe135  Xe137  Xe138
I131Org I131Elem      I131Part
I132Org I132Elem      I132Part
I133Org I133Elem      I133Part
I134Org I134Elem      I134Part
I135Org I135Elem      I135Part
Rb86   Cs134   Cs136   Cs137
Sb127  Sb129  Te127m  Te127   Te129m Te129   Te131m Te132
Ba137m Ba139  Ba140
Mo99   Tc99m  Ru103   Ru105   Ru106   Rh105
Y90    Y91    Y92     Y93     Zr95    Zr97    Nb95
La140  La141  La142   Pr143   Nd147   Am241   Cm242   Cm244
Ce141  Ce143  Ce144   Np239   Pu238   Pu239   Pu240   Pu241
Sr89   Sr90   Sr91    Sr92
end_participating_isotopes

core
thermal_power      1969
elemental_iodine_frac 0.0485
organic_iodine_frac  0.0015
particulate_iodine_frac 0.95
release_frac
to_control_volume   DW
Time    N_Gas    I_Grp    CsGrp    TeGrp    BaGrp    NMtls    CeGrp    LaGrp    SrGrp
0.008   0         0        0         0         0         0         0         0         0
0.508   0.1       0.1      0.1       0         0         0         0         0         0
2.008   0.633    0.167    0.133     0.033    0.0133   0.00167  0.00033  0.00013  0.0133
707     0         0        0         0         0         0         0         0         0
end_to_control_volume
end_release_frac
end_core

control_volume
obj_type      OBJ_CV
name          DW
air_volume    1.80e+005
water_volume  0
surface_area  1
has_recirc_filter false
removal_rate_to_surface
Time    NobleGas    ElemIodine    OrgIodine    PartIodine    Solubles    Insolubles
0.1663  0.          0.1884        0.           0.1884        0.1884      0.1884
0.3710  0.          29.112        0.           29.112        29.112      29.112
0.4142  0.          0.1391        0.           0.1391        0.1391      0.1391
0.4645  0.          31.715        0.           31.715        31.715      31.715
0.7019  0.          0.2725        0.           0.2725        0.2725      0.2725
0.9336  0.          43.141        0.           43.141        43.141      43.141
1.1291  0.          0.3249        0.           0.3249        0.3249      0.3249
1.2935  0.          47.768        0.           47.768        47.768      47.768
1.4341  0.          38.321        0.           38.321        38.321      38.321
1.4998  0.          22.051        0.           22.051        22.051      22.051
1.5698  0.          18.779        0.           18.779        18.779      18.779
  
```

1.6567	0.	17.362	0.	17.362	17.362	17.362
1.7535	0.	16.711	0.	16.711	16.711	16.711
2.0073	0.	16.450	0.	16.450	16.450	16.450
2.3386	0.	5.6187	0.	5.6187	5.6187	5.6187
3.7749	0.	6.398	0.	6.398	6.398	6.398
4.6334	0.	0.0645	0.	0.0645	0.0645	0.0645
5.9327	0.	2.3642	0.	2.3642	2.3642	2.3642
6.3527	0.	3.4811	0.	3.4811	3.4811	3.4811
6.8036	0.	4.4852	0.	4.4852	4.4852	4.4852
7.2442	0.	5.4898	0.	5.4898	5.4898	5.4898
7.6754	0.	6.4876	0.	6.4876	6.4876	6.4876
7.7909	0.	7.4403	0.	7.4403	7.4403	7.4403
24.729	0.	0.1997	0.	0.1997	0.1997	0.1997
707	0.	0.0	0.	0.0	0.0	0.0

end\_removal\_rate\_to\_surface

frac\_4\_daughter\_resusp\_from\_surface

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
707	1	0	0	0	0

end\_frac\_4\_daughter\_resusp\_from\_surface

end\_control\_volume

control\_volume

obj_type	OBJ_CV
name	WW
air_volume	1.28e+005
water_volume	8.2e+004
surface_area	0
has_recirc_filter	false

removal\_rate\_to\_waterpool

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles	Insolubles
1.129	0	0	0	0	0	0
3.778	0	1.5	0	1.5	1.5	1.5
5.222	0	0	0	0	0	0
7.844	0	0.15	0	0.15	0.15	0.15
707	0	0	0	0	0	0

end\_removal\_rate\_to\_waterpool

frac\_4\_daughter\_resusp\_from\_water

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
707	1	0	0	0	0

end\_frac\_4\_daughter\_resusp\_from\_water

decontamination\_factor

Time	NobleGas	ElemIodine	OrgIodine	PartIodine	Solubles
707	1	1	1	1	1

end\_decontamination\_factor

end\_control\_volume

control\_volume

obj_type	OBJ_CV
name	SL
air_volume	32.36

```
water_volume 0
surface_area 1
has_recirc_filter false
removal_rate_to_surface
Time NobleGas ElemIodine OrgIodine PartIodine Solubles Insolubles
0.5117 0 0 0 1.3604 1.3604 1.3604
1.0089 0 0 0 2.5427 2.5427 2.5427
2.2385 0 0 0 2.4120 2.4120 2.4120
2.8033 0 0 0 2.5895 2.5895 2.5895
3.0875 0 0 0 2.1079 2.1079 2.1079
5.0413 0 0 0 1.3937 1.3937 1.3937
9.8705 0 0 0 0.6557 0.6557 0.6557
14.115 0 0 0 0.3987 0.3987 0.3987
24.008 0 0 0 0.3718 0.3718 0.3718
707.00 0 0 0 0.0 0.0 0.0
end_removal_rate_to_surface
```

```
frac_4_daughter_resusp_from_surface
Time NobleGas ElemIodine OrgIodine PartIodine Solubles
Insolubles
707 1 1 0 0 0
0
end_frac_4_daughter_resusp_from_surface
```

end\_control\_volume

```
control_volume
obj_type OBJ_CV
name Dummy
air_volume 1
water_volume 0
surface_area 0
has_recirc_filter false
end_control_volume
```

```
control_volume
obj_type OBJ_CR
name Control_Room
air_volume 27500
water_volume 0
surface_area 0
has_recirc_filter false
breathing_rate
Time (hr) Value (cms)
707 0.000347
end_breathing_rate
```

```
occupancy_factor
Time (hr) Value (frac)
11 1
707 0.25
end_occupancy_factor
```

end\_control\_volume

```
junction
junction_type AIR_JUNCTION
downstream_location AIR_SPACE
upstream CORE
```

```
downstream DW
flow_rate
Time (hr) Rate (cfm)
0.508 1
707 1
end_flow_rate
has_filter false
end_junction

junction
junction_type AIR_JUNCTION
downstream_location WATER_POOL
upstream DW
downstream WW
has_filter false
flow_rate
Time (hr) Value (cfm)
1.129 0
1.296 9180
2.008 0
707 3e+004
end_flow_rate
end_junction

junction
junction_type AIR_JUNCTION
downstream_location AIR_SPACE
upstream DW
downstream Dummy
has_filter false
flow_rate
Time (hr) Value (cfm)
24 0.96
707 0.48
end_flow_rate
end_junction

junction
junction_type AIR_JUNCTION
downstream_location AIR_SPACE
upstream DW
downstream SL
has_filter false
flow_rate
Time (hr) Value (cfm)
11 0.095
707 0.0475
end_flow_rate
end_junction

junction
junction_type AIR_JUNCTION
downstream_location AIR_SPACE
upstream SL
downstream environment
has_filter true
flow_rate
```

```

Time (hr)      Value (cfm)
11             0.170
707           0.085
end_flow_rate
    
```

```

filter_efficiency
Time   NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
707   0              0.50           0              0              0
0
end_filter_efficiency
    
```

```

frac_4_daughter_resusp
Time   NobleGas      ElemIodine      OrgIodine      PartIodine      Solubles
Insolubles
707   1              0              0              0              0
0
end_frac_4_daughter_resusp
    
```

```

X_over_Q_4_ctrl_room
Time (hr)      Value (s/m*3)
3.7           0.00271
11            0.000876
83            0.000863
707          0.000845
end_X_over_Q_4_ctrl_room
    
```

```

X_over_Q_4_site_boundary
Time (hr)      Value (s/m*3)
707           0
end_X_over_Q_4_site_boundary
    
```

```

X_over_Q_4_low_population_zone
Time (hr)      Value (s/m*3)
11            4.23e-5
83            1.82e-5
707          5.43e-6
end_X_over_Q_4_low_population_zone
    
```

end\_junction

```

junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           DW
downstream         Dummy
has_filter         false
flow_rate
Time (hr)          Value (cfm)
24                0.12
707               0.06
end_flow_rate
end_junction
    
```

```

junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
    
```

```

upstream          DW
downstream        Dummy
has_filter        false
flow_rate
Time (hr)         Value (cfm)
24                0.045
707               0.0225
end_flow_rate
end_junction

junction
junction_type     AIR_JUNCTION
downstream_location AIR_SPACE
upstream          DW
downstream        Dummy
has_filter        false
flow_rate
Time (hr)         Value (cfm)
24                0.0301
707               0.0151
end_flow_rate
end_junction

junction
junction_type     AIR_JUNCTION
downstream_location AIR_SPACE
upstream          WW
downstream        DW
has_filter        false
flow_rate
Time (hr)         Value (cfm)
1.296             0
1.463             9180
2.008             0
707               3e+004
end_flow_rate
end_junction

junction
junction_type     AIR_JUNCTION
downstream_location AIR_SPACE
upstream          WW
downstream        Dummy
has_filter        false
flow_rate
Time (hr)         Value (cfm)
24                0.76
707               0.38
end_flow_rate
end_junction

junction
junction_type     AIR_JUNCTION
downstream_location AIR_SPACE
upstream          WW
downstream        Dummy
has_filter        false

```

INPUT.DAT

```

flow_rate
Time (hr)      Value (cfm)
24             0.130
707           0.065
end_flow_rate
end_junction

```

```

junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           environment
downstream         Control_Room
has_filter         false
flow_rate
Time (hr)          Value (cfm)
720               14000
end_flow_rate
end_junction

```

```

junction
junction_type      AIR_JUNCTION
downstream_location AIR_SPACE
upstream           Control_Room
downstream         environment
has_filter         false
flow_rate
Time (hr)          Value (cfm)
720               14000
end_flow_rate

```

```

X_over_Q_4_ctrl_room
Time (hr)          Value (s/m*3)
720               0
end_X_over_Q_4_ctrl_room

```

```

X_over_Q_4_site_boundary
Time (hr)          Value (s/m*3)
720               0
end_X_over_Q_4_site_boundary

```

```

X_over_Q_4_low_population_zone
Time (hr)          Value (s/m*3)
720               0
end_X_over_Q_4_low_population_zone

```

end\_junction

```

environment
breathing_rate_sb
Time (hr)          Value (cms)
707               0.0
end_breathing_rate_sb

```

```

breathing_rate_lpz
Time (hr)          Value (cms)
11                0.000175
707               0.000232

```

end\_breathing\_rate\_lpz

end\_environment

**Attachment 3.1: Excerpts of STARDOSE RESULTS.OUT  
for EAB Worst 2 Hour Determination**

\*Note since the EAB worst 2 hours occurs BEFORE the delayed steam line releases, only Case 1 needs to be looked at.

STARDOSE 1.01 (c) 1996-2002 Polestar Applied Technology, Inc.  
Wed Mar 21 14:47:40 2007

edit time 0.000000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	0.00E+000	0.00E+000	0.00E+000	0.00E+000
LPZ dose:	0.00E+000	0.00E+000	0.00E+000	0.00E+000

edit time 0.250000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	3.18E-001	8.84E-003	7.88E-003	1.26E-002
LPZ dose:	3.21E-002	8.13E-004	7.13E-004	1.30E-003

edit time 0.500000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	5.42E-001	2.66E-002	2.12E-002	2.13E-002
LPZ dose:	5.52E-002	2.45E-003	1.94E-003	2.20E-003

edit time 0.750000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	1.54E+000	7.51E-002	5.53E-002	6.51E-002
LPZ dose:	1.57E-001	6.93E-003	5.07E-003	6.79E-003

edit time 1.000000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	1.89E+000	1.65E-001	1.20E-001	7.97E-002
LPZ dose:	1.94E-001	1.52E-002	1.10E-002	8.34E-003

edit time 1.250000  
environment

	thyroid	wbody	skin	CEDE
--	---------	-------	------	------

EAB dose:	2.85E+000	2.99E-001	2.15E-001	1.22E-001
LPZ dose:	2.91E-001	2.72E-002	1.95E-002	1.27E-002

edit time 1.500000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	3.43E+000	4.81E-001	3.43E-001	1.46E-001
LPZ dose:	3.45E-001	4.24E-002	3.03E-002	1.49E-002

edit time 1.750000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	4.13E+000	6.77E-001	4.80E-001	1.75E-001
LPZ dose:	4.15E-001	5.97E-002	4.23E-002	1.78E-002

edit time 2.000000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	4.89E+000	8.94E-001	6.31E-001	2.06E-001
LPZ dose:	4.93E-001	7.89E-002	5.57E-002	2.11E-002

edit time 2.250000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	5.63E+000	1.16E+000	8.11E-001	2.35E-001
LPZ dose:	5.62E-001	1.00E-001	7.04E-002	2.38E-002

edit time 2.500000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	6.14E+000	1.41E+000	9.86E-001	2.54E-001
LPZ dose:	6.11E-001	1.20E-001	8.43E-002	2.55E-002

edit time 2.750000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	6.56E+000	1.65E+000	1.15E+000	2.68E-001
LPZ dose:	6.52E-001	1.39E-001	9.75E-002	2.69E-002

edit time 3.000000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	6.94E+000	1.87E+000	1.30E+000	2.80E-001
LPZ dose:	6.90E-001	1.57E-001	1.10E-001	2.81E-002

edit time 3.250000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	7.31E+000	2.08E+000	1.45E+000	2.92E-001
LPZ dose:	7.27E-001	1.74E-001	1.22E-001	2.93E-002

edit time 3.500000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	7.68E+000	2.28E+000	1.59E+000	3.03E-001
LPZ dose:	7.64E-001	1.90E-001	1.33E-001	3.05E-002

edit time 3.750000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	8.03E+000	2.47E+000	1.73E+000	3.15E-001
LPZ dose:	8.00E-001	2.06E-001	1.44E-001	3.16E-002

edit time 4.000000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	8.39E+000	2.66E+000	1.85E+000	3.26E-001
LPZ dose:	8.36E-001	2.20E-001	1.54E-001	3.27E-002

edit time 4.250000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	8.75E+000	2.83E+000	1.98E+000	3.37E-001
LPZ dose:	8.42E-001	2.24E-001	1.57E-001	3.29E-002

edit time 4.500000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	9.11E+000	2.99E+000	2.10E+000	3.48E-001
LPZ dose:	8.48E-001	2.27E-001	1.59E-001	3.31E-002

edit time 4.750000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	9.46E+000	3.15E+000	2.21E+000	3.59E-001
LPZ dose:	8.54E-001	2.30E-001	1.61E-001	3.33E-002

edit time 5.000000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	9.81E+000	3.30E+000	2.32E+000	3.70E-001
LPZ dose:	8.60E-001	2.33E-001	1.64E-001	3.35E-002

edit time 5.250000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	1.02E+001	3.44E+000	2.43E+000	3.82E-001
LPZ dose:	8.66E-001	2.36E-001	1.66E-001	3.37E-002

edit time 5.500000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	1.05E+001	3.58E+000	2.53E+000	3.93E-001
LPZ dose:	8.71E-001	2.39E-001	1.68E-001	3.38E-002

edit time 5.750000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	1.09E+001	3.71E+000	2.64E+000	4.04E-001
LPZ dose:	8.77E-001	2.42E-001	1.70E-001	3.40E-002

edit time 6.000000  
environment

	thyroid	wbody	skin	CEDE
EAB dose:	1.12E+001	3.84E+000	2.73E+000	4.14E-001
LPZ dose:	8.83E-001	2.44E-001	1.72E-001	3.42E-002

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Wed Mar 21 14:47:47 2007

Total elapsed hours: 0, mins: 0, secs: 7

**Attachment 3.2: STARDOSE RESULTS.OUT for EAB Worst time period determination**

**Table 3.2.1: Rough Determination**

Using the input files for Case 1, 2 and 3, and holding the X/Q's constant, the following doses were determined. Using 1hr time increments over the first 24 hours, the dose rate accumulation was analyzed to hone in on the worst two hour period for EAB dose accumulation.

t	Case 1		Case 2		Case 3		Total	2 hour increase	
	WB	CEDE	WB	CEDE	WB	CEDE			
0	0.00E+00	0.00E+00					0.00E+00		
1	1.65E-01	7.97E-02					2.45E-01		
2	8.94E-01	2.06E-01					1.10E+00	1.10E+00	(2 hr-0hr)
3	1.87E+00	2.80E-01					2.15E+00	<b>1.9053</b>	(3 hr- 1 hr)
4	2.66E+00	3.26E-01					2.99E+00	1.886	(4 hr - 2 hr)
5	3.30E+00	3.70E-01					3.67E+00	1.52	(...)
6	3.84E+00	4.14E-01					4.25E+00	1.268	
7	4.29E+00	4.58E-01					4.75E+00	1.078	
8	4.68E+00	5.01E-01	0.00E+00	0.00E+00			5.18E+00	0.927	
9	5.02E+00	5.43E-01	2.91E-03	5.89E-02			5.62E+00	8.77E-01	
10	5.32E+00	5.84E-01	6.43E-02	4.79E-01			6.45E+00	1.27E+00	
11	5.58E+00	6.26E-01	2.01E-01	6.84E-01			7.09E+00	1.46619	
12	5.82E+00	6.66E-01	3.07E-01	6.84E-01			7.48E+00	1.0297	
13	6.04E+00	7.06E-01	4.03E-01	6.84E-01	0.00E+00	0.00E+00	7.83E+00	0.742	
14	6.24E+00	7.46E-01	4.91E-01	6.84E-01	1.88E-03	0.00E+00	8.16E+00	0.68588	
15	6.42E+00	7.85E-01	5.72E-01	6.84E-01	1.51E-02	0.00E+00	8.48E+00	0.6431	
16	6.59E+00	8.24E-01	6.47E-01	6.84E-01	4.34E-02	0.00E+00	8.79E+00	0.62552	
17	6.75E+00	8.63E-01	7.18E-01	6.84E-01	7.89E-02	0.00E+00	9.09E+00	0.6178	
18	6.90E+00	9.01E-01	7.84E-01	6.84E-01	1.18E-01	0.00E+00	9.39E+00	0.5986	
19	7.04E+00	9.39E-01	8.45E-01	6.84E-01	1.60E-01	0.00E+00	9.67E+00	0.5741	
20	7.18E+00	9.76E-01	9.04E-01	6.84E-01	2.02E-01	0.00E+00	9.95E+00	0.559	
21	7.31E+00	1.01E+00	9.59E-01	6.84E-01	2.43E-01	0.00E+00	1.02E+01	0.538	
22	7.43E+00	1.05E+00	1.01E+00	6.84E-01	2.84E-01	0.00E+00	1.05E+01	0.512	
23	7.55E+00	1.09E+00	1.06E+00	6.84E-01	3.23E-01	0.00E+00	1.07E+01	0.501	
24	7.66E+00	1.12E+00	1.11E+00	6.84E-01	3.62E-01	0.00E+00	1.09E+01	0.478	

The largest EAB dose rate accumulation occurs at about 1 to 3 hours. This period is further refined in Table 3.2.2.

**Table 3.2.2: Refines 2 Hour Determination**

Values used in this table were taken from the results found in Attachment 3.1, and combined here for quick reference.

t	WB	CEDE	Total	
0	0.00E+00	0.00E+00	0.00E+00	
0.25	8.84E-03	1.26E-02	2.14E-02	
0.5	2.66E-02	2.13E-02	4.79E-02	
0.75	7.51E-02	6.51E-02	1.40E-01	
1	1.65E-01	7.97E-02	2.45E-01	
1.25	2.99E-01	1.22E-01	4.21E-01	
1.5	4.81E-01	1.46E-01	6.27E-01	
1.75	6.77E-01	1.75E-01	8.52E-01	<b>2 hour increase</b>
2	8.94E-01	2.06E-01	1.10E+00	1.10E+00 (2 hr-0hr)
2.25	1.16E+00	2.35E-01	1.40E+00	1.37E+00 (2.25hr-0.25hr)
2.5	1.41E+00	2.54E-01	1.66E+00	1.62E+00 (...)
2.75	1.65E+00	2.68E-01	1.92E+00	1.78E+00
3	1.87E+00	2.80E-01	2.15E+00	1.91E+00
3.25	2.08E+00	2.92E-01	2.37E+00	1.95E+00
3.5	2.28E+00	3.03E-01	2.58E+00	<b>1.96E+00</b>
3.75	2.47E+00	3.15E-01	2.79E+00	1.93E+00
4	2.66E+00	3.26E-01	2.99E+00	1.89E+00
4.25	2.83E+00	3.37E-01	3.17E+00	1.77E+00
4.5	2.99E+00	3.48E-01	3.34E+00	1.67E+00
4.75	3.15E+00	3.59E-01	3.51E+00	1.59E+00
5	3.30E+00	3.70E-01	3.67E+00	1.52E+00
5.25	3.44E+00	3.82E-01	3.82E+00	1.45E+00
5.5	3.58E+00	3.93E-01	3.97E+00	1.39E+00
5.75	3.71E+00	4.04E-01	4.11E+00	1.33E+00
6	3.84E+00	4.14E-01	4.25E+00	1.27E+00

It can be seen above that the worst 2 hour EAB accumulation occurs between 1.5 and 3.5 hours.

**Attachment 3.3: Excerpts of STARDOSE RESULTS.OUT  
 (21-day and 30-day CR/Env Edits) for Case 1**

STARDOSE 1.01 (c) 1996-2002 Polestar Applied Technology, Inc.  
 Thu Mar 22 12:26:27 2007

edit time 504.000000

Control\_Room

	thyroid	wbody	skin	CEDE
Total dose:	4.76E+001	2.28E-001	8.74E+000	1.53E+000
Noble gas	0.00E+000	2.25E-001	8.70E+000	0.00E+000
Org iodine	2.30E+001	4.91E-004	8.63E-003	7.11E-001
Elem iodine	2.15E+001	2.53E-003	2.91E-002	6.76E-001
Part iodine	2.91E+000	2.54E-004	3.29E-003	9.16E-002
Cesium	2.33E-002	1.25E-005	0.00E+000	2.59E-002
Tellurium	1.15E-001	4.50E-006	0.00E+000	5.46E-003
Barium	2.27E-004	6.66E-007	0.00E+000	9.15E-004
Noble metal	9.16E-005	4.74E-007	0.00E+000	4.87E-003
Lanthanides	1.68E-005	2.54E-007	0.00E+000	2.92E-003
Cerium	7.51E-006	1.74E-007	0.00E+000	1.06E-002
Strontinum	2.89E-005	4.54E-006	0.00E+000	5.32E-003

environment

	thyroid	wbody	skin	CEDE
EAB dose:	5.05E+000	1.71E+000	1.18E+000	2.00E-001
LPZ dose:	1.64E+000	4.38E-001	3.70E-001	5.91E-002

	thyrd_eab	wbody_eab	skin_eab	CEDE_eab	thyrd_lpz	wbody_lpz
skin_lpz	CEDE_lpz					
Noble gas	0.00E+000	1.69E+000	1.18E+000	0.00E+000	0.00E+000	4.31E-001
3.68E-001	0.00E+000					
Org iodine	1.09E+000	2.72E-003	1.00E-003	3.42E-002	6.15E-001	8.12E-004
3.57E-004	1.90E-002					
Elem iodine	1.74E+000	8.05E-003	2.59E-003	5.50E-002	5.74E-001	3.74E-003
1.13E-003	1.82E-002					
Part iodine	2.11E+000	5.98E-003	2.15E-003	6.62E-002	4.31E-001	1.39E-003
4.86E-004	1.35E-002					
Cesium	1.62E-002	3.23E-004	0.00E+000	1.81E-002	3.45E-003	6.87E-005
0.00E+000	3.84E-003					
Tellurium	1.02E-001	1.47E-004	0.00E+000	4.85E-003	1.72E-002	2.49E-005
0.00E+000	8.14E-004					
Barium	2.02E-004	2.17E-005	0.00E+000	8.13E-004	3.40E-005	3.69E-006
0.00E+000	1.37E-004					
Noble metal	8.19E-005	1.55E-005	0.00E+000	4.36E-003	1.38E-005	2.63E-006
0.00E+000	7.33E-004					
Lanthanides	1.50E-005	8.13E-006	0.00E+000	2.61E-003	2.53E-006	1.36E-006
0.00E+000	4.40E-004					
Cerium	6.71E-006	5.72E-006	0.00E+000	9.49E-003	1.13E-006	9.62E-007
0.00E+000	1.60E-003					
Strontinum	2.56E-005	1.45E-004	0.00E+000	4.75E-003	4.33E-006	2.52E-005
0.00E+000	7.97E-004					

edit time 720.000000

Control\_Room

	thyroid	wbody	skin	CEDE
Total dose:	4.83E+001	2.29E-001	8.80E+000	1.56E+000
Noble gas	0.00E+000	2.25E-001	8.76E+000	0.00E+000
Org iodine	2.37E+001	4.94E-004	8.69E-003	7.32E-001
Elem iodine	2.16E+001	2.54E-003	2.91E-002	6.79E-001
Part iodine	2.91E+000	2.54E-004	3.29E-003	9.16E-002
Cesium	2.33E-002	1.25E-005	0.00E+000	2.59E-002
Tellurium	1.15E-001	4.50E-006	0.00E+000	5.46E-003
Barium	2.27E-004	6.66E-007	0.00E+000	9.15E-004
Noble metal	9.16E-005	4.74E-007	0.00E+000	4.87E-003
Lanthanides	1.68E-005	2.54E-007	0.00E+000	2.92E-003
Cerium	7.51E-006	1.74E-007	0.00E+000	1.06E-002
Strontinum	2.89E-005	4.54E-006	0.00E+000	5.32E-003

environment

	thyroid	wbody	skin	CEDE
EAB dose:	5.05E+000	1.71E+000	1.18E+000	2.00E-001
LPZ dose:	1.66E+000	4.38E-001	3.72E-001	5.97E-002

	thyrd_eab	wbody_eab	skin_eab	CEDE_eab	thyrd_lpz	wbody_lpz
skin_lpz						
Noble gas	0.00E+000	1.69E+000	1.18E+000	0.00E+000	0.00E+000	4.32E-001
3.70E-001	0.00E+000					
Org iodine	1.09E+000	2.72E-003	1.00E-003	3.42E-002	6.29E-001	8.16E-004
3.58E-004	1.94E-002					
Elem iodine	1.74E+000	8.05E-003	2.59E-003	5.50E-002	5.81E-001	3.75E-003
1.13E-003	1.84E-002					
Part iodine	2.11E+000	5.98E-003	2.15E-003	6.62E-002	4.31E-001	1.39E-003
4.86E-004	1.35E-002					
Cesium	1.62E-002	3.23E-004	0.00E+000	1.81E-002	3.45E-003	6.87E-005
0.00E+000	3.84E-003					
Tellurium	1.02E-001	1.47E-004	0.00E+000	4.85E-003	1.72E-002	2.49E-005
0.00E+000	8.14E-004					
Barium	2.02E-004	2.17E-005	0.00E+000	8.13E-004	3.40E-005	3.69E-006
0.00E+000	1.37E-004					
Noble metal	8.19E-005	1.55E-005	0.00E+000	4.36E-003	1.38E-005	2.63E-006
0.00E+000	7.33E-004					
Lanthanides	1.50E-005	8.13E-006	0.00E+000	2.61E-003	2.53E-006	1.36E-006
0.00E+000	4.40E-004					
Cerium	6.71E-006	5.72E-006	0.00E+000	9.49E-003	1.13E-006	9.62E-007
0.00E+000	1.60E-003					
Strontinum	2.56E-005	1.45E-004	0.00E+000	4.75E-003	4.33E-006	2.52E-005
0.00E+000	7.97E-004					

STARDOSE 1.01 (c) 1996-2002 Polestar Applied Technology, Inc.  
 Thu Mar 22 12:27:50 2007

Total elapsed hours: 0, mins: 1, secs: 23

**Attachment 3.4: Excerpts of STARDOSE RESULTS.OUT  
 (30-day CR/Env Edits) for Case 2**

**\*Note, times are on a 8.7 hour delay from accident time**

STARDOSE 1.01 (c) 1996-2002 Polestar Applied Technology, Inc.  
 Thu Mar 22 13:09:38 2007

edit time 495.300000

Control\_Room

	thyroid	wbody	skin	CEDE
Total dose:	3.89E+001	5.04E-002	2.50E+000	1.71E+000
Noble gas	0.00E+000	4.87E-002	2.47E+000	0.00E+000
Org iodine	1.03E+001	1.56E-004	2.98E-003	3.17E-001
Elem iodine	1.47E+000	7.04E-004	7.22E-003	4.95E-002
Part iodine	2.59E+001	7.18E-004	1.28E-002	8.02E-001
Cesium	2.34E-001	1.25E-004	0.00E+000	2.60E-001
Tellurium	1.00E+000	2.73E-005	0.00E+000	4.75E-002
Barium	2.10E-003	5.48E-006	0.00E+000	8.30E-003
Noble metal	8.66E-004	3.40E-006	0.00E+000	4.60E-002
Lanthanides	1.57E-004	1.62E-006	0.00E+000	2.75E-002
Cerium	6.91E-005	1.48E-006	0.00E+000	1.00E-001
Strontinum	2.34E-004	1.33E-005	0.00E+000	4.91E-002

environment

	thyroid	wbody	skin	CEDE
EAB dose:	0.00E+000	0.00E+000	0.00E+000	0.00E+000
LPZ dose:	4.23E-001	4.72E-002	6.80E-002	1.71E-002

	thyrd_eab	wbody_eab	skin_eab	CEDE_eab	thyrd_lpz	wbody_lpz
skin_lpz	CEDE_lpz					
Noble gas	0.00E+000	0.00E+000	0.00E+000	0.00E+000	0.00E+000	4.56E-002
6.74E-002	0.00E+000					
Org iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.94E-001	1.50E-004
8.02E-005	5.96E-003					
Elem iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.38E-002	9.42E-004
2.55E-004	5.13E-004					
Part iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	2.05E-001	4.17E-004
1.99E-004	6.35E-003					
Cesium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.86E-003	7.31E-005
0.00E+000	2.07E-003					
Tellurium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	7.89E-003	1.58E-005
0.00E+000	3.74E-004					
Barium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.65E-005	3.17E-006
0.00E+000	6.54E-005					
Noble metal	0.00E+000	0.00E+000	0.00E+000	0.00E+000	6.89E-006	1.98E-006
0.00E+000	3.66E-004					
Lanthanides	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.25E-006	9.12E-007
0.00E+000	2.19E-004					
Cerium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	5.49E-007	8.55E-007
0.00E+000	7.98E-004					

Strontinum 0.00E+000 0.00E+000 0.00E+000 0.00E+000 1.85E-006 7.71E-006  
0.00E+000 3.88E-004

edit time 711.300000

Control\_Room

	thyroid	wbody	skin	CEDE
Total dose:	3.93E+001	5.07E-002	2.54E+000	1.72E+000
Noble gas	0.00E+000	4.90E-002	2.51E+000	0.00E+000
Org iodine	1.07E+001	1.58E-004	3.01E-003	3.30E-001
Elem iodine	1.47E+000	7.07E-004	7.25E-003	4.95E-002
Part iodine	2.59E+001	7.18E-004	1.28E-002	8.02E-001
Cesium	2.34E-001	1.25E-004	0.00E+000	2.60E-001
Tellurium	1.00E+000	2.73E-005	0.00E+000	4.75E-002
Barium	2.10E-003	5.48E-006	0.00E+000	8.30E-003
Noble metal	8.66E-004	3.40E-006	0.00E+000	4.60E-002
Lanthanides	1.57E-004	1.62E-006	0.00E+000	2.75E-002
Cerium	6.91E-005	1.48E-006	0.00E+000	1.00E-001
Strontinum	2.34E-004	1.33E-005	0.00E+000	4.91E-002

environment

	thyroid	wbody	skin	CEDE
EAB dose:	0.00E+000	0.00E+000	0.00E+000	0.00E+000
LPZ dose:	4.30E-001	4.75E-002	6.90E-002	1.73E-002

	thyrd_eab	wbody_eab	skin_eab	CEDE_eab	thyrd_lpz	wbody_lpz
skin_lpz	CEDE_lpz					
Noble gas	0.00E+000	0.00E+000	0.00E+000	0.00E+000	0.00E+000	4.59E-002
6.84E-002	0.00E+000					
Org iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	2.02E-001	1.52E-004
8.11E-005	6.20E-003					
Elem iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.38E-002	9.45E-004
2.56E-004	5.14E-004					
Part iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	2.05E-001	4.17E-004
1.99E-004	6.35E-003					
Cesium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.86E-003	7.31E-005
0.00E+000	2.07E-003					
Tellurium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	7.89E-003	1.58E-005
0.00E+000	3.74E-004					
Barium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.65E-005	3.17E-006
0.00E+000	6.54E-005					
Noble metal	0.00E+000	0.00E+000	0.00E+000	0.00E+000	6.89E-006	1.98E-006
0.00E+000	3.66E-004					
Lanthanides	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.25E-006	9.12E-007
0.00E+000	2.19E-004					
Cerium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	5.49E-007	8.55E-007
0.00E+000	7.98E-004					
Strontinum	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.85E-006	7.71E-006
0.00E+000	3.88E-004					

STARDOSE 1.01 (c) 1996-2002 Polestar Applied Technology, Inc.  
Thu Mar 22 13:09:56 2007

Total elapsed hours: 0, mins: 0, secs: 18

**Attachment 3.5: Excerpts of STARDOSE RESULTS.OUT  
 (30-day CR/Env Edits) for Case 3**

**\*Note, times are on a 13 hour delay from accident time**

STARDOSE 1.01 (c) 1996-2002 Polestar Applied Technology, Inc.  
 Thu Mar 22 13:10:05 2007

edit time 491.000000

Control\_Room

	thyroid	wbody	skin	CEDE
Total dose:	1.04E+001	1.42E-002	8.39E-001	4.13E-001
Noble gas	0.00E+000	1.39E-002	8.34E-001	0.00E+000
Org iodine	4.86E+000	4.61E-005	9.09E-004	1.49E-001
Elem iodine	7.07E-001	1.43E-004	1.54E-003	2.26E-002
Part iodine	4.60E+000	9.69E-005	1.88E-003	1.42E-001
Cesium	4.38E-002	2.34E-005	0.00E+000	4.87E-002
Tellurium	1.74E-001	4.28E-006	0.00E+000	8.25E-003
Barium	3.77E-004	9.83E-007	0.00E+000	1.49E-003
Noble metal	1.57E-004	5.71E-007	0.00E+000	8.33E-003
Lanthanides	2.90E-005	3.66E-007	0.00E+000	5.01E-003
Cerium	1.24E-005	2.53E-007	0.00E+000	1.82E-002
Strontinum	4.08E-005	1.54E-006	0.00E+000	8.86E-003

environment

	thyroid	wbody	skin	CEDE
EAB dose:	0.00E+000	0.00E+000	0.00E+000	0.00E+000
LPZ dose:	1.72E-001	2.18E-002	3.54E-002	6.04E-003

	thyrd_eab	wbody_eab	skin_eab	CEDE_eab	thyrd_lpz	wbody_lpz
skin_lpz	CEDE_lpz					
Noble gas	0.00E+000	0.00E+000	0.00E+000	0.00E+000	0.00E+000	2.15E-002
3.52E-002	0.00E+000					
Org iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.26E-001	7.12E-005
3.92E-005	3.85E-003					
Elem iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	8.40E-003	2.27E-004
6.33E-005	2.80E-004					
Part iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	3.64E-002	5.64E-005
2.95E-005	1.13E-003					
Cesium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	3.47E-004	1.36E-005
0.00E+000	3.86E-004					
Tellurium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.38E-003	2.49E-006
0.00E+000	6.53E-005					
Barium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	2.99E-006	5.72E-007
0.00E+000	1.18E-005					
Noble metal	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.25E-006	3.33E-007
0.00E+000	6.62E-005					
Lanthanides	0.00E+000	0.00E+000	0.00E+000	0.00E+000	2.30E-007	2.12E-007
0.00E+000	3.98E-005					
Cerium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	9.83E-008	1.47E-007
0.00E+000	1.45E-004					

Strontinum 0.00E+000 0.00E+000 0.00E+000 0.00E+000 3.23E-007 8.97E-007  
0.00E+000 7.03E-005

edit time 707.000000

Control\_Room

	thyroid	wbody	skin	CEDE
Total dose:	1.07E+001	1.44E-002	8.70E-001	4.23E-001
Noble gas	0.00E+000	1.41E-002	8.66E-001	0.00E+000
Org iodine	5.22E+000	4.78E-005	9.37E-004	1.60E-001
Elem iodine	7.08E-001	1.44E-004	1.55E-003	2.26E-002
Part iodine	4.60E+000	9.69E-005	1.88E-003	1.42E-001
Cesium	4.38E-002	2.34E-005	0.00E+000	4.87E-002
Tellurium	1.74E-001	4.28E-006	0.00E+000	8.25E-003
Barium	3.77E-004	9.83E-007	0.00E+000	1.49E-003
Noble metal	1.57E-004	5.71E-007	0.00E+000	8.33E-003
Lanthanides	2.90E-005	3.66E-007	0.00E+000	5.01E-003
Cerium	1.24E-005	2.53E-007	0.00E+000	1.82E-002
Strontinum	4.08E-005	1.54E-006	0.00E+000	8.86E-003

environment

	thyroid	wbody	skin	CEDE
EAB dose:	0.00E+000	0.00E+000	0.00E+000	0.00E+000
LPZ dose:	1.78E-001	2.21E-002	3.62E-002	6.23E-003

	thyrd_eab	wbody_eab	skin_eab	CEDE_eab	thyrd_lpz	wbody_lpz
skin_lpz	CEDE_lpz					
Noble gas	0.00E+000	0.00E+000	0.00E+000	0.00E+000	0.00E+000	2.17E-002
3.60E-002	0.00E+000					
Org iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.32E-001	7.28E-005
3.99E-005	4.04E-003					
Elem iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	8.40E-003	2.28E-004
6.35E-005	2.80E-004					
Part iodine	0.00E+000	0.00E+000	0.00E+000	0.00E+000	3.64E-002	5.64E-005
2.95E-005	1.13E-003					
Cesium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	3.47E-004	1.36E-005
0.00E+000	3.86E-004					
Tellurium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.38E-003	2.49E-006
0.00E+000	6.53E-005					
Barium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	2.99E-006	5.72E-007
0.00E+000	1.18E-005					
Noble metal	0.00E+000	0.00E+000	0.00E+000	0.00E+000	1.25E-006	3.33E-007
0.00E+000	6.62E-005					
Lanthanides	0.00E+000	0.00E+000	0.00E+000	0.00E+000	2.30E-007	2.12E-007
0.00E+000	3.98E-005					
Cerium	0.00E+000	0.00E+000	0.00E+000	0.00E+000	9.83E-008	1.47E-007
0.00E+000	1.45E-004					
Strontinum	0.00E+000	0.00E+000	0.00E+000	0.00E+000	3.23E-007	8.97E-007
0.00E+000	7.03E-005					

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Thu Mar 22 13:10:26 2007

Total elapsed hours: 0, mins: 0, secs: 21